CHEMICAL MARKETS

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Census Form 100, Section 6

Last summer key men in chemical circles received from the Advisory Committee of the Census of Manufacturers, a cordial invitation to criticize the questionnaire upon which the Census of 1930 will be based. But suggestions on Section 6 of the form were ruled out. As this Section (covering the quantity and value of products produced) is the heart of the census, so far as chemicals are concerned, its exemption from discussion was significant.

As an industry we enjoy a bad reputation for this sort of secrecy. When Mr. Hoover, as Secretary of Commerce, offered to help collect reliable chemical statistics, he was told, politely but firmly, that his assistance was unacceptable. With the alkali group it is common practice to discount by twenty per cent the Government's production figures. These are rather good. We know of instances where the official totals represent less than half of the output.

"Weighted indexes", purporting to show the trend of chemical prices are therefore more amusing than useful to those in the know. It is infamous that, although sulfuric acid, caustic, and ash are splendid indicators of national industrial activity, these basic chemicals are utterly ignored by statisticians so that the truly fundamental position of the chemical industry is inadequately appreciated in financial, economic, and congressional circles. These are broad, almost altruistic considerations. Plainly they weigh little against so-called practical and supposedly selfish motives inspiring secrecy. But there are sound business arguments against the ostrich policy.

Price controlled by comparatively inflexible demand—as in chemicals—puts the job of adjusting supply squarely up to producers. As we periodically discover this is a costly, dangerous task. Better statistics would make these readjustments less painful. Accurate foreknowledge would kill many ill-advised new chemical ventures and expansions by old plants thus materially relieving the competitive pressure on chemical prices. A nucleus of far-sighted chemical executives are convinced that certain knowledge of marketing conditions is better than the best guess. They point to coal-tar dyes and alcohol as proofs that this knowledge made public is not ruinous. Section 6 is their rallying point for better chemical statistics.

"Headquarters"

The chemical family is very numerous. It has a number of lusty young cousins and a few old maid aunts. For its size, however, it is closely knitted together. Blood is thicker than water. Three-quarters of the chemical output is consumed right within the chemical family.

This is a peculiar industrial condition, and largely because of it a reputation within the bounds of the chemical industry itself is especially valuable to any maker of chemicals. What his competitors think of a manufacturer of bedsteads or of boathooks may be aplenty; but their thoughts seldom reach the ears of the young Newlyweds or the Old Salts who make up the background of their respective consuming markets. Not so in the chemical market places, as the sales manager of one of our oldest chemical companies recently had proved to his own complete dissatisfaction.

He sells more of a certain chemical than any two of his three chief competitors put together. His company is the original manufacturer of this particular product. Yet a very simple test enabled him to discover that right within the chemical family one of these competitors is generally considered to be "headquarters" for this pet product of his. Upon the basis of intra-industry demand and the new business that naturally drifts the way of the "headquarters" producer he has estimated that within three years this fictitious reputation will be a sober fact. This disconcerting probability or encouraging possibility (according to the position of your own company) puts a high premium upon your chemical reputation within the chemical family circle.

Speculation De Luxe

That the speculative urge hits very close to home has been demonstrated by the numerous replies which have come in in answer to the questions concerning the possible effects of synthetic alcohol production on the meticulously balanced quotas at present established, propounded on our "We" page last month. These reactions elicited from our readers are less interesting in the various replies to our queries than in the questions they in turn propounded. One good question apparently deserves another and the following are some of the most pertinent speculations which have been received.

What effect will increased production have upon the future course of methanol and acetone? Will lower prices open up new markets and where or why?

How long will it be before the steel companies start to buy phosphoric acid instead of sulfuric, and produce ammonium phosphate instead of ammonium sulfate?

What chemical will win the three-cornered battle now waging for control of the refrigeration market?

Will the new tariff materially upset the comparative equilibrium which has been established in the present chemical situation?

Will the du Pont expansion in the ammonia field lead into the fertilizer market or will that company continue to confine its chief interest in this product to refrigeration?

How much higher will the business peak rise and has the business cycle been turned into a rising curve—permanently?

These questions seem singularly appropriate at this season which marks the opening of the business year during which some are apt to be answered. We make no attempt to extend our peregrinations into the realm of the prophetic. We merely pass the speculative queries along as food for further speculation, with the added thought that it is problems such as these which will determine future changes in the chemical situation. The wise chemical executive is engaged in considerable speculation of this nature.

A Poor Excuse

With but few exceptions every well-known chemical company is on the list of corporations whose income tax statements of profits and other data were requested from the Treasury by the Senate Finance Committee for use during the debate on the tariff bill. The income tax data made available by this manoeuver does not include the total of tax paid, but does reveal the profit and loss statements, wages paid workers, salaries paid officers, gross sales, and inventories.

The excuse for this magnificient display of legislative acumen is that this information is vital to the equitable adjustment of tariff rates. Our legislators reason in this fashion: If a corporation's earnings are high, a higher duty on any product manufactured by that company is not necessary. The fallacy of such reasoning, especially as applied to the chemical industry, is apparent. Of what possible value could information of this sort

be when practically every company under consideration makes a well diversified line of products?

The excuse is inept and so obviously an excuse, that the Senate leaves itself open to the grave charge of playing politics with confidential information. More recent and more startling activities in Congress have diverted the public's attention; but nothing can detract from the justice of industry's indictment of the Senate on the grounds of obtaining information under false pretenses.

Quotation Marks

One of the greatest industries in the State of Florida is seriously threatened by the importation from Morocco of phosphate produced by government monopoly employing cheap labor and moving this phosphate to foreign ports over government owned railroads and from these foreign ports to ports of the United States in ships as ballast. Shipments of the Moroccan phosphate increased from 8181 tons in 1921 to 1,337,000 tons in 1928, and if the American producers are not protected this Moroccan monopoly whose production is increasing at such a rapid rate will close the mines of this country.—*John T. Burrows.*

It would seem that industrial research should be essentially the concern of the industry itself and in order that the scientific workers engaged may have the advantage of that vast fund of technical knowledge which has accrued by practice and experience in the industry, there must be the closest contact between the laboratory and the technical worker.—*Col. F. Vernon Willey.*

The time is not far distant, predict those who are conversant with German rayon affairs, when—perhaps with one solitary exception—the German rayon industry will be closely related to each other both financially and in respect to production. With the one exception there is practically no rayon factory in Germany which is not in some way allied with another similar enterprise.—*Daily News Record.*

The difficulties put in the path of British chemical manufacturers by the United States tariffs have been very serious ones for the industry in this country and the passage of time has not made them less. —*Chemical Trade Journal.*

World domination by one nation through science is only possible if others, by their inaction, make it possible. Our chemists must make every effort to keep abreast of research.—*Industrial and Engineering Chemistry.*

Industry has come to recognize that advertising, instead of being a luxury to be tacked on at the end of a business that can afford it, or a nuisance into which the producer is forced reluctantly by persuasion or competition, takes its place among the first essentials of sale and distribution, among the first and most productive charges on industry.—*Chemical Age.*

Energy costs and fixed charges make up most of the cost of producing synthetic nitrogen. Since energy in many parts of America is very cheap, and since capital is eagerly seeking outlet in the chemical industries, there is no reason why we should continue to derive from abroad so large a part of the nitrogen that is needed for our crops.—*Industrial Bulletin.*

We have passed from the age when sentimental value had much to do with purchase of clothing. We do not greatly care whether a silkworm in China or a chemist in Cleveland is the author of our ties or dresses.—*Silicate P's & Q's.*

We are interested in trade with Germany, and if Germany can't sell to us she can't buy from us.—*Herman A. Metz.*

Ten Years Ago

From our issues of October, 1919

General Alcohol Export Corp. was formed to do an alcohol export business under provisions of the Webb-Pomerene Act. Organizers were William F. Wolfner, Frederick N. Harrison, William A. Cornell, Lester I. Bacharach, Julius Kessler, Everett W. Wilson, Philip Publicker and Harry Publicker, and Frank H. Delaney.

Frank S. Washburn, president, American Cyanamid Co., was appointed chairman, New York committee, Cornell University Endowment Drive.

U. S. Industrial Alcohol Co. increased authorized common share capital from $12,000,000 to $23,000,000.

Grasselli Chemical Co. closed Terre Haute plant owing to an unexpected strike of employees.

Department of Agriculture decided against policy of fixing prices of fertilizer materials.

G. Ober & Sons Co., Baltimore, acquired property upon which to construct three-story administration building.

L. A. Ault, president, Ault & Wiborg, was decorated by King Albert of Belgium with Belgium Cross.

Virginia-Carolina Chemical Co. planned for erection of seven buildings at Charleston, S. C., for manufacture of fertilizers.

Sulfuric acid shortage prevailed owing to underestimates of requirements for that year.

Ammonium sulfate was scarce owing to steel strike and unexpectedly heavy export demand from England.

Chemicals

in the

MOVIES

By G. E. Matthews
Kodak Research Laboratories

ABOUT 1889 Thomas Edison obtained the first length of "film ribbon" from George Eastman. Since that date the manufacture of film has developed rapidly until it is now recognized as one of the world's leading industries. Scientific research has assisted and is contributing to a considerable extent in this development. For many years after the manufacture of film was started only two types of film were prepared, negative film for use in the camera, and positive film for making the projection prints from the negative. During the last decade, however, the requirements of the trade have changed and several different types of negative and positive films are now being manufactured, each especially adapted to a specific purpose.

Motion picture film as used to-day consists of two layers, a thin translucent film containing a suspension of light sensitive silver salts in gelatin, and a thicker transparent layer made either of cellulose nitrate or cellulose acetate. The light sensitive layer is called the *emulsion*; the lower layer, the *film base or support.* Unexposed film is known as *raw stock*, and exposed and developed film as *finished film*. Both the manufacturing and the developing processes are chemical operations.

The principal chemicals used in film manufacture are: (1) for the film base—cotton, various acids, and solvents such as wood alcohol, amyl acetate, etc.; (2) for the emulsion—gelatin, silver, potassium bromide. potassium iodide, and various dyes. Chemicals used in processing the exposed film are: (1) for development—organic reducing agents (pyrogallol, hydro-quinone, etc.) sodium sulfite, certain alkalis, and potassium bromide; (2) for fixation—sodium thiosulfate, sodium sulfite, various acids, and potassium or chromium alum; (3) for after treatment—various oxidizers, dyes, solvents for cleaning the film, waxes for lubrication, and chemicals for recovery of silver from used fixing baths.

In the preparation of film base or support, cotton is chemically treated to remove vegetable gums and other impurities. After carefully drying in huge dryers to eliminate all moisture it is nitrated with a mixture of nitric and sulfuric acids. The sulfuric acid is obtained by burning elemental sulfur to sulfur dioxide and conversion of this to sulfur trioxide catalytically. This is then absorbed by 80 per cent acid which is brought up to a strength of 98 per cent. Nitric acid is obtained by distillation from sodium nitrate and sulfuric acid. With use, the mixture of nitric and sulfuric acids used for nitration of the cotton becomes diluted with water and is re-conditioned by adding strong sulfuric acid.

Mechanical mixers are used to nitrate the cotton after which the acid and cotton are sent through a pipe to a centrifugal which, when rotated at high speed, separates the excess acid from the cotton. Next, the nitrated cotton is immersed in large tanks of water and drained and rinsed over a period of weeks. Centrifugal wringers spun at high speed remove all the moisture before the cotton is ready for the solvents.

Huge drums or barrels having a capacity of 4,000 pounds each are used to bring about a thorough mixing of the cotton and the solvent, the chief constituent of which is wood alcohol. Softeners such as camphor are also added in order to impart flexibility to the film base. The drums are sealed and revolved for a period of several days and the solution which results has the consistency of syrup or extracted honey. This is then pumped through mechanical filter-presses to render it absolutely free from dirt, dust, or foreign particles.

This "dope," is next piped to air-tight tanks and

held ready to be converted into sheets. The solution, now glass-clear, is poured on the surface of great polished wheels which run continuously night and day. One of these wheels, of which there are upwards of 50 at Kodak Park, now produces twenty-five times as much film base as the whole of the first Eastman factory.

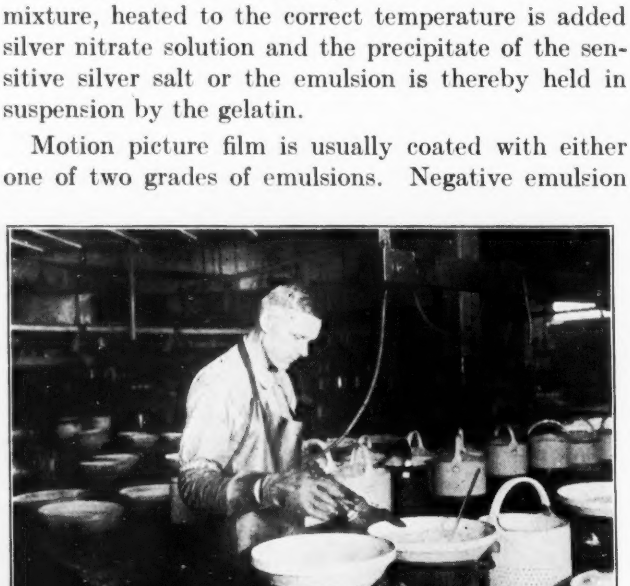
As the film must be uniform in thickness, this operation calls for extreme care in handling. The standard thickness of film base is from 0.005 to 0.00525 of an inch, and the degree of accuracy obtained is such that the variation does not exceed 0.00025 of an inch in sheets 2,000 feet long and 3½ feet wide.

For easy handling the base is rolled on a core in large rolls similar to newsprint rolls and in this form, after a period of aging, is sent to the sensitizing rooms.

Silver is the active element in the sensitizing material called the "emulsion" with which the film is coated. The pure silver bullion comes in bars, each weighing about 42 pounds. The bars are dissolved in nitric acid in porcelain dishes, and after crystallization, pure crystals of silver nitrate are obtained. Other ingredients of the emulsion are potassium iodide, potassium bromide, and gelatin.

Photographic gelatin is prepared from calf skin by soaking the skins in lime water and subsequently extracting with hot water in a large gelatin plant. The gelatin is dissolved in water and the bromide and iodide solutions carefully mixed with it. To this mixture, heated to the correct temperature is added silver nitrate solution and the precipitate of the sensitive silver salt or the emulsion is thereby held in suspension by the gelatin.

Motion picture film is usually coated with either one of two grades of emulsions. Negative emulsion is very sensitive to light, and is used in the camera, while positive emulsion which is much less light sensitive, is used for printing the pictures afterwards viewed on the screen. About ten times more positive film is used than negative film. All emulsion making is conducted in rooms lighted with safelights which have been specially manufactured for this purpose.



Preparing silver nitrate which is the active element in the sensitizing material called the emulsion with which the film is coated.

The actual operations of making the emulsion are conducted in silver-lined steam-jacketed vessels provided with suitable agitators. Soluble salts formed during the reaction must be washed out of the emulsion. This is accomplished by chilling it to a jelly, then shredding it by pressing the mass through a chamber with a perforated bottom and sides, and washing the spaghetti-like strands many times with cold water. The shredded emulsion is then melted and coated on the film base.

The film base or "dope" is stored in these air-tight tanks while awaiting conversion into sheets. The insert shows one of the two barrels which held all the "dope" made in 1891.

For this operation special delicate machinery is necessary in order to control the thickness precisely. The film base is handled in such a way that only one side comes in contact with the heated emulsion. After the film is coated it is carried in large loops through the drying rooms and when thoroughly dried, motion picture film is automatically cut from this into strips 1⅜ inches wide, and wound in rolls varying from 100 to 1,000 feet in length.

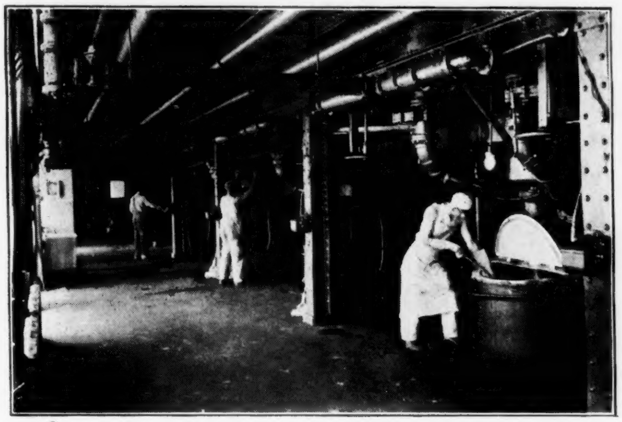
The film is then perforated on very precise machines, wrapped in black paper, and sealed in tin cans ready for shipment.

Safety film is made with the slow-burning cellulose acetate base in both the standard 35 mm. width for use on portable projectors and in the 16 mm. width for amateur use. It is manufactured in much the same way as cellulose nitrate except that acetic anhydride is used instead of nitric acid for treating the cotton to render it soluble in the organic solvents.

Special negative emulsions suitable for use in conjunction with sound motion pictures are also being manufactured and used. Two classes are supplied according as the photographic sound record (which is printed along one edge of the film) is a variable area or saw-tooth type or a variable density or bar type.

Dyes are used extensively in connection with motion picture film both during and subsequent to manufacture. Their employment may be classified according as they are incorporated (1) in the film support, or (2) in the gelatin emulsion.

(1) The application of dyes to film support is usually limited to positive film. When the film base is dyed, a general tint is given to the picture which makes it more pleasing when projected on the screen. In the case of tinted film with an accompanying sound record, it is necessary that the light transmitted by the various tints should affect the photoelectric cell in the sound recording apparatus to the same extent. Eastman films with tinted base are now available having such properties. The film base of negative film has sometimes been dyed in connection with certain color motion picture processes, wherein the dyed base serves as a color filter and limits the light passing through the film to definite spectral regions.



The mechanical mixers and centrifugal wringers, the first of which nitrates the cotton while the latter removes the excess acid.

(2) Dyes are added to the emulsion of negative film to make it color sensitive. The wet collodion plate used from about 1840 to 1870 was sensitive chiefly to the blue and violet and was practically insensitive to green and red radiations. It was not until 1873 that Vogel observed that certain dyes could be added to photographic emulsions to increase their sensitiveness to the yellow and green portions of the spectrum. Emulsions sensitized in this way came to be known as *orthochromatic.* Later, other sensitizing dyes were found which gave red sensitivity to emulsions and such emulsions are known as *panchromatic.*

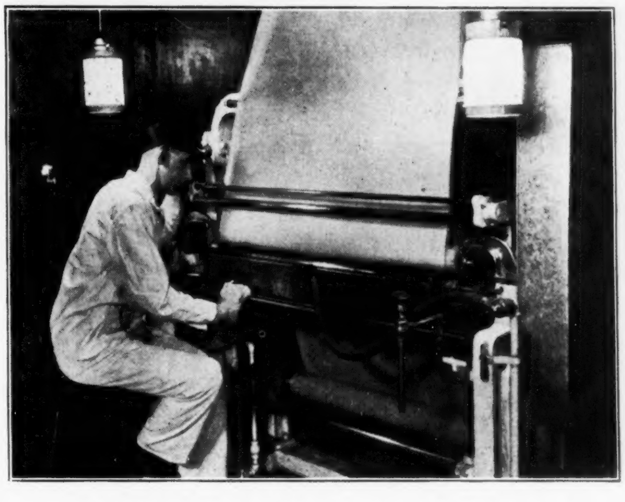
Of the many hundreds of sensitizing dyes developed during the last twenty years, less than a dozen have found extensive commercial use. Some of those most commonly employed are: green sensitiziers,—erythrosine, rhodamine B, pinaflavol, orthochrome T, red sensitizers,—pinacyanol, naphthacyanol, and dicyanine A.

Panchromatic motion picture film was introduced about 1914 and since that date its properties have been improved steadily. It came into general use about 1927 and by 1928 the major portion of all motion picture negatives were being made on panchromatic stock. For color photography processes its use is essential as most color processes require the preparation of from 1 to 3 negative records each exposed through the proper color filter. Panchromatic film is also used for making pictures in sunlight which resemble night exposures. For this work color filters are used which transmit the infra-red but absorb all visible radiation except the extreme red. To sensitize the film to the red and infra-red, it is either treated during manufacture or subsequently bathed in solutions of either of the sensitizing dyes, kryptocyanine or neocyanine.

The gelatin layer of developed positive film is sometimes stained with dyes to produce tinting effects similar to those obtained when the film base is dyed. The picture or image may also be colored by chemical toning. This consists in treating the picture with a bleaching solution which also acts as a mordant for subsequent dyeing. By this method the original silver image is replaced by a dye image. Combinations of tinting and toning are used frequently.

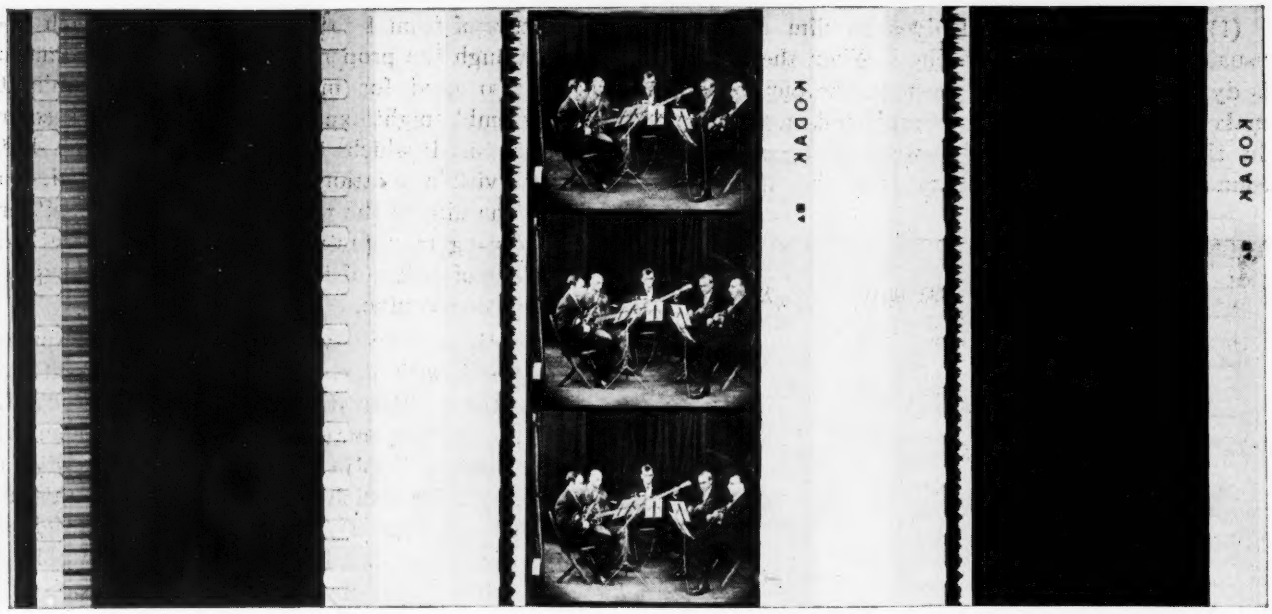
Besides their use in the layers of the film itself, dyes are used for the preparation of color filters and in the manufacture of safelights for darkroom illumination. Color filters are placed before the camera lens during exposure in order to control the light rays affecting the film. For example, a yellow filter which absorbs blue light is often used when exposing panchromatic film because this film is relatively more sensitive to this color of light. If such a filter were not used, the blue parts of the subject would be overexposed in the negative. Filters also find an important application in aerial cinematography for the elimination of the effects of atmospheric haze.

During the past two years, film developing laboratories have adopted quite generally a new developer



Machine used for coating one side of the film base with heated emulsion.

for negative development which was worked out by J. G. Capstaff and R. A. Purdy of the Kodak Research Laboratories. The theory of its action is relatively simple. Besides the reducing agent, the formula contains a high concentration of sulfite which is a solvent for silver halide and a low concentration of



There are two classes of photographic sound record—the variable density or bar type is shown on left and the variable area or sawtooth area on right. The center strip shows the picture on a film with the variable area sound record.

alkali (borax) which makes the rate of development quite slow. As development progresses, the sulfite actually dissolves away some of the silver halide crystals before they are reduced by the developing agent with the result that several adjoining crystals are separated and after development they appear as distinct particles of silver instead of a large mass or clump. When prints from these negatives are projected, the pictures have better photographic quality than pictures from negatives developed in the normal way, because the "graininess" or coarseness of the image has been reduced by the negative development treatment.

The introduction of sound motion pictures has necessitated improvements in the methods of cleaning films, since small particles of dirt or grease on the sound track reproduce as unpleasant noises. Suitable cleaning liquids are carbon tetrachloride and certain chlorine substituted compounds of ethylene and ethane. It is important that such liquids should be free from sulfur compounds and should not decompose in the presence of moisture with the liberation of hydrochloric acid which would injure the film. Film lubricants such as paraffin and other waxes are often applied to the film surface for insuring easy passage of the film through the projector. Solvents for the film support such as acetone, ethyl acetate, and amyl acetate have found a useful application in the compounding of film cements.

The principal methods used for the recovery of silver from used fixing baths are (a) precipitation of the silver with sodium sulfide, (b) precipitation by the addition of zinc, (c) precipitation with sodium hydrosulfite, and (d) electrolytic methods.

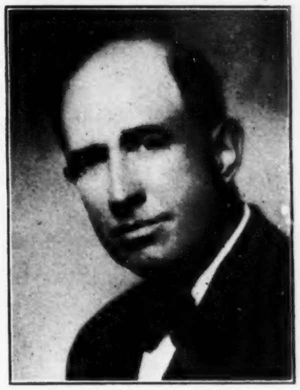
Theoretical research has also advanced considerably during the past quarter century. The chief chemical problems have been concerned with (1) the study of the cause of senstiveness of photographic emulsions, and (2) the physico-chemical reactions which form the basis of emulsion making. An exhaustive study of these problems has been conducted in the Kodak Research Laboratories. One problem of practical as well as theoretical interest is the work done by S. E. Sheppard and his collaborators on the isolation of the sensitizing substances in photographic gelatin.

For many years emulsion makers have known that certain gelatins were satisfactory and others were unsatisfactory for photographic use. Several years ago it was found that an extract could be prepared from a good gelatin which, on addition to a relatively inert gelatin, made it photographically active. An extensive investigation was then begun by the Research Laboratories in conjunction with the Manufacturing Department. The entire process of gelatin manufacture was subjected to a thorough analysis. Hides, bones, cereal preparations, and many other substances were examined. Finally it was shown conclusively that a derivative of mustard oil, called *allyl thiocarbamide*, was the sensitizing substance. Its presence in minute concentrations of 1 part in 1,000,000 to 1 part in 300,000 was shown to be the cause of the suitability of certain gelatins for use in photographic emulsions.

During the emulsion making process, this substance is converted over by a series of reactions into silver sulfide which was shown to be present as small specks or nuclei in the crystals of silver halide. The presence of these nuclei was proven to be necessary in order that the grains be made developable.

Previously, it was necessary to reject many samples of gelatin which were incapable of producing highly sensitive emulsions owing to the absence of the necessary mustard oils. It is now possible to utilize such gelatins with satisfaction by adding traces of the mustard oils to the gelatin solution during the emulsion making process.

SOLVENTS



By Rolland H. French,
President, Chemical Solvents, Inc.

WHEN a freshman in college, I was asked by the quiz master why sugar was soluble in water and marble was not. I replied that marble was formed by a chemical and physical reaction taking place during the formation period of the Earth, when under intense heat and pressure followed by cooling, very hard and dense rocks were formed, while sugar was a bulky crystaline substance originally held in solution in the juice of the sugar cane from which it is obtained. I was told that my answer showed that I had studied my geology. My preferred interest in solvents started with this experience. A solvent is a liquid which is capable of carrying in solution other substances or combinations of substances with the purpose of transferring same to a desired place for deposition without injury to the carried substance and being entirely volatile or absorbable so as to leave no residue or reaction to interfere with the value of the deposited material it has carried.

Water is the nearest thing to a universal solvent that is known and yet, in our modern use of solvents in the varnish and lacquer industries, it is the worst enemy we have and we must constantly strive for its elimination in our solvents and prevention of its absorption until the film is formed which must be water resistant.

Importance of Ethyl Alcohol

Ethyl alcohol, C_2H_2OH, commonly known as grain alcohol, is next to water as the most universal and valuable of our solvents, as well as the raw material for other valuable solvents. We of the United States were deprived of the general use of this solvent for many years and our chemical development was behind that of Europe partly on this account. On June 7th, 1906, Congress finally passed the Denatured Alcohol Act, since which time we have been able to get tax-free ethyl alcohol for most solvent and industrial purposes. Owing to the lack of harmony in the enforcement of our regulatory laws we are still somewhat hampered in the proper use of this most valuable raw material.

Wood alcohol, CH_2OH, (methyl alcohol) now called methanol is perhaps next in line as the most universal and valuable solvent. Unlike ethyl alcohol it is a violent poison when taken into the human organism and for this reason it was extensively used as a solvent for shellac, celluloid, etc., before the free use of denatured alcohol was possible. It is still a better solvent for many purposes than ethyl alcohol and should the new synthetic methods which have been developed for its production bring the price to the consumer below that of dematured alcohol it is a certainty that its use will be enormously increased.

The synthetic process for the production of methanol, at least on a commercial scale, is a post war development and we must give a large measure of the credit for the practical commercialization of this as well as other synthetic methods of making solvents, to the German chemists.

Amyl Alcohol and Amyl Acetate

Amyl alcohol or fusel oil is one of the oldest of the solvents as well as the base for amyl acetate, the combination of the two being the anchor of our limited lacquer and collodion industry for many years. The source of amyl alcohol is a by-product in the fermentation of ethyl alcohol. Even with our large alcohol and whiskey industries in pre-prohibition days we never made enough in this country to fill the demand and large quantities were imported from Holland and Russia, the latter being a by-product of the fermentation of vodka. In view of the above facts amyl products were so high in price that they forced narrow limitations on lacquers made with them. Amyl alcohol is now made synthetically from petroleum but the process and product are so irregular and uncertain both as to cost and quality, as to preclude its extended use.

Acetone, $(CH_3)_2O$, (dimethyl ketone) is possibly the next in line as an important solvent. It is absolutely essential in the manufacture of certain kinds of smokeless powder and this fact caused intensive research during the early days of the World War, the result being that a fermentation process was developed from cornstarch which produced a wonderful yield of pure

quality acetone at a very much lower cost than could be obtained by the old method, namely, the destructive distillation of acetate of lime. It is very evident that the use of acetone is in its infancy and that many of our manufacturers of artificial silk and allied products will use it in increasing quantities as we have more ample sources of supply. It might be mentioned that in the pre-war days the by-products were known commercially as acetone oils and chemically as methyl ketones, and were largely used in the production of lacquers for leather and artificial leather manufacturing in spite of their very offensive and persistent odor.

Methyl acetone which is a by-product of the refining of wood alcohol made by the wood distillation process, has been for years an exceedingly important solvent. It is still valuable in limited quantities but the users depending on it might as well make up their minds to find a substitute as the enormous development of the production of synthetic methanol is going to drive the wood burner almost, if not entirely, out of business.

Ethyl acetate is the solvent par excellence, developed since the possibility of tax-free ethyl alcohol and the increased and cheaper production of acetic acid. The commercial and economic development of ethyl acetate was very rapid from 1914 on, and this is now the principal solvent used in the production of lacquers on a large scale for the leather and artificial leather industry as well as other lacquer manufactures. The use of this product would be considerably increased could the price be somewhat modified.

"Manufacturers and distributors of solvents must count on getting their business as a result of research, quality and service, with a thin margin of profit."

Methyl acetate which is made from methyl alcohol and acetic acid, is a very valuable solvent for some lacquers and was extensively used in connection with the aeroplane industry during the World War. However, this solvent is so unstable that it probably will never be as popular as some of the others.

War Brings Fermentation Acetone

Nothing short of a miracle happened when the fermentation process for the manufacture of acetone was developed under war pressure, for this same fermentation gave a yield of butyl alcohol which was at first a puzzle and a handicap in the process. It then developed that butyl alcohol was all but a twin sister to amyl alcohol and that it had for a practical lacquer purpose, every desirable quality of amyl alcohol and that the acetate made from it had the same desirable qualities as amyl acetate. In addition to these facts it was found that it could be produced so as to cost the consumer about half the price usually asked for amyl alcohol and amyl acetate. There was the basis for the formation of a so greatly enlarged lacquer production as to found a new industry. The practical development of many years of dreams on the part of the lacquer chemist has to-day been realized and we have an enormous industry which is still in its infancy and which has only been possible through the development of a source of supply of large quantities of butyl alcohol at a reasonable price. The only thing that will prevent the lacquer industry from doubling or tripling its present size will be its inability to get increasing quantities of butyl alcohol and ethyl alcohol and ethyl acetate at reasonable prices.

Butyl acetate, as indicated in our paragraph on butyl alcohol, is made from butyl alcohol and acetic acid and is used in even larger quantities than the butyl alcohol per se. The large demand for butyl acetate in the United States stimulated our German friends to the successful development of a synthetic process for making butyl alcohol and butyl acetate. For the past two years we have imported from Germany nearly as much butyl acetate as has been made in this country. This fact was a sad story for the domestic producer as it kept prices down to a point that greatly increased the happiness of the domestic consumer. For a short time the Germans exported butyl alcohol to the United States but our flexible tariff was brought into force so that this was made prohibitive. The Germans, however, soon shifted to increased quantities of butyl acetate so that the above facts have remained constant for many months. The new tariff which is about to be passed by our Congress will, in all probability, make the importation of German butyl acetate prohibitive as we believe it should, so that the production of butyl alcohol in this country will be encouraged and increased, thus using up large quantities of our surplus corn crop.

Cellosolve an Important New Solvent

Among the new solvents developed by the clever efforts of our synthetic chemists, none is more noteworthy than that which is known in the trade as "Cellosolve," or chemically as monoethylether of ethylene glycol. This product has many advantages in that it has a good odor and is a good solvent for pyroxylins. It also has considerable advantage in that solutions made from it will take large quantities of non-toxic petroleum diluents. It, however, has a ready tendency to absorb moisture and blush, which handicaps its extended use unless the cost can be brought down markedly so as to enable it to be used in a different way than that which is now possible.

A number of other synthetic solvents of minor importance have been developed and, while some of

them have much merit, until they can be made more stable and have a lower cost their use will not be very extensive.

Ethyl lactate which has for a long time been known as a very valuable high boiling solvent has comparatively recently been made more practicable by the development of a synthetic process for making it, bringing the cost down to about half what it was under the old method. The use of this product will increase very largely with decreased cost.

In the field of diluents and extenders for lacquer we have seen wonderful improvement. Our coal tar extenders which were the only ones known in pre-war days have been very largely improved so that benzol, toluol and xylol are obtainable in large quantities entirely free from unsaturated compounds which interfere with the quality of lacquers. Our health authorities have discovered that benzol has injurious affects on workers and that many of our industrial or occupational diseases have been caused thereby. This has developed such a large demand for toluol that it has brought a scarcity and unreasonably high price for this product.

The above facts have brought on the market petroleum extenders with the same evaporation ranges as benzol and toluol, which are being very successfully used. The credit for developing these products rests with a western refiner. However, the larger oil companies have recently also entered the field.

Future of Solvents

As for the future, every man connected with the solvent and lacquer industries, is forced to be alert and keep his ear constantly to the ground for new developments and new solvents from the laboratories of our synthetic and research chemists. These chemists are persistently working to develop new and better solvents at lower costs and there is no question that the solvent industry will see many advances which will increase production and reduce costs so that the field for the use of solvents will be greatly enlarged.

The competitive situation is acute and the manufacturers and the distributors of solvents must count for an indefinite time to come, on getting their business as a result of research, quality and service, with a thin margin of profit.

British imports of molasses during the calendar year 1928 for distillers' use in the manufacture of spirits, and for food for stock, show a remarkable increase over the previous year. Total imports were 3,849,864 hundredweight, as compared with 2,578,580 hundredweight—or a gain of a little less than 50 per cent. Taken together with the production of 1,144,525 hundredweight in the United Kingdom sugar beet factories for the season 1927-28, as compared with 753,254 hundredweight in the previous season, the increase becomes still more striking. It is believed that the greater part of this increase is due to the greater use of molasses in the manufacture of industrial alcohol, reports the Department of Commerce.

Aluminum sulfate exported to Japan from the United States during the first quarter of 1929 amounted to 10,709,700 pounds as compared with 9,754,200 pounds during the same period of 1928.

The Industry's Bookshelf

The Modern Practice in the Use of Fertilizers, by Firman E. Bear, 348 pages, J. Wiley & Son, New York $4.00.

Brings together in one volume the points of view concerning fertilizer practice that have been developed by the many workers in this field.

Agricultural Botany, by John Percivall, 839 pages, MacMillan Publishing Company, New York $5.50.

A text-book of botany suited to the wants of the student of agriculture, giving sound working knowledge of the science as applied to farm crops.

Synthetic Economics by Henry Ludwell Moore, 186 pages, MacMillan Co., New York, $3.00 net.

A concrete, positive description of moving equilibria, oscillations, and secular change, by a method which presents all of the interrelated economic quantities in a synthesis of simultaneous, real equations.

The Principles of Thermodynamics by George Birtwistle, 168 pages, MacMillan Co., New York, $2.60 net.

In which the foundation principles of the subject are set out and illustrated by application to various branches of science, where no more than a general knowledge of the science is necessary for their appreciation.

Raw Silk Throwing by Warren P. Seem, 198 pages, McGraw Hill Book Co., New York, $5.00 net.

A discussion of the measuring, classifying and disposition of raw silk, of manufacturing efficiency in raw silk throwing and of the wage system and rates of production in this field.

The Tariff on Iron and Steel, by Abraham Berglund & Philip G. Wright, 240 pages, The Brookings Institution, Washington, D. C. $3.00 net.

One of a series of studies dealing with specific commodities in relation to our tariff policy.

The Story of Water Supply, by Hope Holway, 134 pages, Harper & Bros., New York, $1.25 net.

An interesting and dramatic story for children of the history of water supply and its effect upon civilization.

Practical Salesmanship, by B. J. Williams, 263 pages, The Dartnell Corporation, Chicago and New York, $3.75 net.

The one-time "greatest soap salesman" outlines his unique methods for training salesmen.

Organic Chemistry for Students of Pharmacy and Medicine, by Clark, A. H., D. Van Nostrand Company, 446 pages,

To meet the needs of such students for more extended knowledge of those substances widely used in medicine.

Chemistry of Plant Products, by P. Haas and T. G. Hill, published by Longmans-Green & Company, 220 pages.

A general introduction to the problems of plant metabolism.

Principles of Chemistry, by Joseph H. Roe, 427 pages, C. V. Mosby Co., St. Louis, Mo., $2.50 net.

A textbook for a course in chemistry for nurses.

St. Lawrence Navigation and Power Project, by Harold G. Moulton and others, 672 pages, Brookings Institute, Washington, D. C., $4.00 net.

A consideration of the St. Lawrence waterway in both power and transportation aspects, with reference to both the United States and to Canada.

The World-Wide Influence of Industrial Research

By Edward R. Weidlein*
Director, Mellon Institute of Industrial Research

THE chemical industry has for its task the preparation, from the resources of nature, of a great number of materials suitable for the protection, needs and comforts of man. In 1899, the United States imported only 42 per cent of crude chemical raw materials, and the remainder in finished products, as against 73 per cent of crude materials in 1927. These data show the development of the American chemical industry. With the necessity for more crude materials for processing and manufacturing, the sources of supply have been changed from Europe to the Far East and South America. American consumers are purchasing in greater amounts directly from primary sources and are also gradually reducing their purchases of the finished commodities formerly obtained from Europe. This change has gradually taken place through the application of science to industry; but the arm of science is extending much further, and at a faster pace, in finding new raw materials. Instances are seen in the development of the well-known rayon industry and in the fixation of nitrogen from the air. Americans now have $50,000,000 invested in the domestic synthetic nitrogen industry.

The present condition may be illustrated by describing the shifting of the source of supply of a specific raw material of value. For example, natural camphor from Japan has been largely replaced by the synthetic product of Germany. At present the United States is purchasing more synthetic camphor from Germany than natural camphor from Japan. The next step forward, in the case of an important commodity of this kind, will be to manufacture it in this country. Every industrial nation has an intense desire for chemical independence—a lofty technical position that can only be attained through the proper application of science.

Raw materials that are not available are being developed from other sources, or at least substitutes are being evolved which can be used in case of emergency. The great difficulty which is encountered in the study of the use of substitutes for the strategic raw materials is the fact that the materials for which substitution is to be made are, in most cases, the cheapest ones which will accomplish the desired results; and therefore it cannot be expected that commercial concerns will go very far in the development of a substitution which would increase their costs, if put into use under normal conditions. If, however, co-operation is obtained from those industries which should be interested in the subject, methods will develop with time which will minimize the danger which would otherwise result from any stoppage of the continued flow of imported materials. The successsful development of a subtitute or a new synthesized product immediately stimulates renewed energy on the part of the country affected to meet the situation.

Chemical Industry Self-Contained

The chemical industry is said to be its own best customer. The explanation for this statement is found in the extent to which the chemical industry is self-contained. The finished product of one branch of the industry frequently becomes the raw material for another. Thus the tar distiller produces a distillate that is refined by a chemical manufacturer and sold as a coal-tar intermediate to other manufacturers for the production of dyes, explosives, rubber accelerators, plastics or photographic chemicals. The fertilizer manufacturer makes sulfuric acid, then sells it to the by-product coke plant for use in preparing ammonium sulfate, which is returned to the fertilizer plant for utilization as an ingredient in mixed fertilizers.

The peak of our exports of methanol ("wood alcohol") was reached in 1922. But since 1924 American manufacturers have felt the competition of German synthetic methanol, and exports for 1927 were less than half the 1899 shipments. Scientific

**Abstracted from an address presented at Institute of Politics.*

methods are now being put to use in this country to produce methanol and the foreign challenge is being successfully met, for the exports for 1928 showed a marked increase. The past decade has witnessed the rapid rise of a new branch of the organic chemical industry in the United States based on the conversion of ethylene into organic products of commercial importance. One of these products, ethylene glycol, has found its place in the manufacture of dynamite to such an extent that it greatly reduced the importation of glycerin during 1928. Ethane was used to re-fuel the Graf-Zeppelin in its recent trip to this country, and we supplied its fuel requirements by shipping propane to Japan and California for the round-the-world cruise. In Japan a hydrogen-propane mixture (one-third H) and in California a natural gas-propane mixture (50-50) were taken on by the ship. The activities of many scientists are being concentrated on the problems of aerial transportation.

Modern industrial conditions and the international relationships arising out of them have tended to the concentration of the mineral and metal industries in certain specially favored regions which give them a dominant position, enabling them to hold the balance of power in peace and war—a position that they are likely to keep for several generations to come. Large-scale manufacture has largely replaced the metallurgy of small units, so that metallurgical leadership has come to those countries where the requisite mineral resources occur in sufficient quantity and in the form which modern metallurgical practise favors. It is possible, however, that metallurgical advances of the future may bring into use the poorer, unutilized ores of to-day. And long ere the coal measures are exhausted new sources of energy may be found.

Nation's Welfare Dependent on Research

The application of industrial research largely determines the present and probable future condition of manufacturing in a country. The volume of scientific investigation that a nation carries on is therefore a rough index of its enterprise in international commerce. It must be borne in mind, however, that the industrial research of each country can be applied advantageously only to branches of manufacture that are economically appropriate to that country, and hence the research workers are very often restricted, in their investigations, to the raw materials, minerals and vegetal products, that are available commercially in their nation. The quality of the research that is performed is also a factor of international influence. It is largely dependent upon the ability of the scientists who can be secured and upon the facilities for research that are accorded to them.

It has happened in a number of instances that research specialists have been brought from other nations to conduct research for governmental departments of countries that are endeavoring to become independent of other countries that export to them various industrial products which are essential and whose manufacture, it is thought, can be developed through research. More frequently, however, technical specialists have been "imported" to effect economies in mining and manufacturing operations. The value of the accomplishments of these "imports" cannot be estimated, but in most cases the work concluded has been valuable internationally; for the good that comes from research in one country eventually and invariably reacts to the benefit of other countries that can take advantage of the results.

Science and International Trade

Great Britain is gradually constructing a strong petroleum refining industry of her own, and in doing so is drawing upon the experience and research results of the petroleum industries of other lands. The literature provided her planning basis; having attained the production stage, she is now adding to the published knowledge of petroleum by reporting the results of the studies of her own scientists and engineers. The experience, largely based upon research, of the Scottish shale-oil industry had served as the starting point of the developmental work of other countries having oil-shale deposits. The by-product-coke oven in general use to-day was devised in Germany and developed to industrial success in the United States. The procedures of making coal-tar dyes largely originated in Germany, but have been applied with success and in many instances improved upon in other countries, particularly in the United States since 1916.

In 1870, France made the world's aluminum. The process of extraction invented by C. M. Hall created the great aluminum industry of the United States and Canada, and has also benefited the European aluminum manufacturers. The development of the motor-vehicle industry gave aluminum its first great impetus, and now the production of the metal and its alloys is being continually increased by aviation and the expansion of electrical enterprises. As in all other divisions of chemical industry, a new research product (an alloy in this case) introduced in one country soon becomes available in all other countries that need it, and novel applications found in, say, England are quickly learned of, through intelligence methods, in Switzerland, the United States, and in other aluminum-producing countries.

Three great forces—industrialists seeking markets for their goods, capitalists seeking investments, and scientists seeking new or improved manufacturing processes and products as well as better means of communication and transportation—have affected the foreign and commercial relations of every important country. These forces have actuated the busy world of shops and factories; they have brought the steamships, railways and airways that have made the world one great market place; they have given us the convenient means of communication afforded by the post, telegraph, telephone, and radio. They

have also moved the machinery of colonization, Westernization, and industrial development, and have thus opened the way for trade.

All countries are depending more and more upon their export trade to keep their own factories in profitable operation. That this business is vital to national prosperity is shown by the fact that, in 1928, the foreign trade of the United States, in all its forms, amounted to more than ten billion dollars. The motor industry is especially active in foreign markets. Of the 32,028,000 automobiles in use throughout the world, 28,551,000 are of American manufacture. Of the 6,336,000 cars in foreign countries, excluding Canada, about 2,881,000 came from the United States. The automobile of to-day is a product of mechanical, metallurgical and chemical research; and the automobile industry is the chief support of another big manufacture that is based largely upon the results of scientific research, namely, the tire industry. The latter is, in turn, the principal user of zinc oxide and carbon black, two products of chemical industry whose manufacture and use have been made efficient through scientific investigation.

The great value of science is that it does not know any boundaries. It is constantly bringing the world closer together, which has the tendency to standardize customs. Foreign trade is no longer used as a dumping ground for surplus manufactured products, but, on the contrary, is a highly competitive field, where products are bought and sold on merit. Industrial countries that manufacture chemical commodities more economically than their competitors take prominent positions in both the export and import trade. There is no lack of available scientific skill, and, with the discovery and development of the consumer, which is becoming international in character, competitive forces are bound to increase.

International Industrial Co-operation

Those who create the effective demand also create the future. Cultivating the consumer and appreciating his importance will have more to do with international relationships than all the political devices that can be established. This developmental work will necessitate the introduction of more and more scientific methods in the study of the problems of distribution. The personality factor has been revealed as a particularly important element in creating markets. The closer the contacts, the better will become the understanding between nations, because in this way will be extended the same industrial co-operative measures among business executives as now exist among the scientific professions. International trade and commerce make essential the union of interests and co-operation. This combination is already apparent in the formation of international cartels in Europe as well as in the development of finance corporations between certain European countries and the United States. These coalitions embrace those manufactures which are vital to the self-protection of a nation, such as the dyestuff, fertilizer, solvent, fuel and metallurgical industries.

Transportation Costs and Chemical Trade

It is often more profitable to import certain fine chemical products, such as synthetic organic chemicals than to attempt to make them in many countries. Usually, however, acids, alkalies, some fertilizers, and other heavy chemicals are made whenever possible, and in most countries their manufacture increases progressively, because transportation costs prevent importations. Tariff on chemicals adds to the development of their production and sometimes to the volume of research that is carried on. Foreign patentees of processes and products usually establish works in other important countries, either by their own capital or by granting licenses to others. But when the transportation cost is a minor consideration, the tariff has less effect in inducing the manufacture of a foreign article in another country.

General Summary

The international aspects of industrial research may be thus summarized concisely:—

(1) It tends to promote much the same world-wide good-will and co-operativeness as are imparted by science and pure science research, on which it depends for progress. It encourages the exchange of experience among all workers, being restricted, in certain cases, only by reasons of national exigency and by industrial requirements. Usually, however, the industrial research men of one nation are no more limited in their concurrence with the workers in another country than they are with their professional fellows in their own land.

(2) It recognizes the scientific obligation of reporting all research results in the literature just as soon as possible; and thus discoveries soon become available internationally, to the interest or benefit of all.

(3) It regards the principles of technogeography as guiding lights in creating or building-up the industries of every country. That is, in advancing technology it bears in mind the influence of man's geographical surroundings upon his work, inventions and discoveries. It therefore discourages international selfism, both economic and industrial.

(4) Industrial research is essentially scientific investigation conducted with due regard to economic considerations. It therefore copes scientifically with all problems arising from foreign competition and gives proper attention to natural resources, labor conditions, transportation, etc. It realizes that there is room in the world for competitors in industry, and that, as industrial rivals prosper, opportunities for research are extended.

Increasing Chemical Output

through

The Growth of Individual Plants

By Willard L. Thorp

National Bureau of Economic Research, Inc.

THE most remarkable fact in the history of industry for the last fifty years has been the increase in output. Population has increased slowly; discoveries of natural resources have been few; there have been no pronounced legal or political changes. But industry has turned out more and more of the staple commodities, and has continually added new items to the national catalog.

There have been many factors which have contributed to this advance. Scientific and technical discoveries have been important. Improvements in management technique and labor training have appeared. But there have also been changes in the factory itself. This factor seemed sufficiently important to warrant special investigation in connection with the report on *Recent Economic Changes* prepared by the National Bureau of Economic Research, Inc., for a special committee of the President's Conference on Unemployment.

Plants Not Growing Larger

The investigation turned up a number of surprising facts. Manufacturing establishments are not growing larger in terms of number of wage earners. The highest point was reached in 1923, when the average for all factories was nearly 45 workers. Since then it has slightly declined. Comparing 1925 with 1914, it appears that 155 industries show some increase in the number of wage earners per establishment, 157 industries some decrease, and 9 remain unchanged. By and large the increase in output has not come during the last few years from increasing the number of workers.

But when one examines the records of machinery and other mechanical equipment, as depicted by the Census figures for horsepower, the story changes. Increases in machinery have been extraordinary during the last few years. Each census has recorded considerable gains, and the period from 1914 to 1927 saw the average horsepower per establishment increase by 63 per cent. Certainly here is a factor of extreme importance in understanding the continual expansion in production by modern industry.

But perhaps the most significant result of this investigation is emphasis on the fact that these trends are by no means uniform throughout industry. Some industries are advancing and some are declining. Some are increasing the number of plants operating, others are reducing their operations. And even within one industry, the various producers seldom fare alike. An examination of nine industries showed that, in eight of them, the large plants had gained business at a faster rate from 1923 to 1925 than had the middle-sized concerns. The larger concerns sold a larger percentage of the industry's product in the latter year.

Chemical Industry's Growth Above Average

But this last conclusion, that various industries are advancing at different rates, raises the question as to the part that the various chemical industries have played in recent years. Has it been general ? Thirty-seven industries are regarded by the Census Bureau as chemical industries. If the figures for these industries are added together and then compared with those for industry as a whole, we find that, whereas the value of products for all manufactures increased 163.1 per cent from 1914 to 1927, the products of these chemical industries increased 200.3 per cent. Using the number of wage earners as our criterion, all manufacturing industries increased by 21.3 per cent while the chemical industries gained

40.6 per cent. As a group, the chemicals have certainly been growing more rapidly than other industries.

But the process of adding together these thirty-seven different industries to form a group called "chemicals" is somewhat misleading. What should be included in such a list? The Census includes petroleum refining, and that accounts for one-third of all the "chemical industry." If it is omitted, then the picture of the "chemical industries" looks very different. In order to understand what has actually happened, it would be best to examine each industry separately,* but that would be exhausting. Consequently, they have been grouped in seven groups. The importance and growth of each group is shown in the following table:

Value of Products

	Total, 1927 millions of dollars	*Rate of increase (per cent)*		
		1914-27	*1919-27*	*1925-27*
Raw chemicals	813.0	180.5	19.5	6.7
Medicines, perfumes, etc.	559.0	225.3	45.0	16.2
Explosives	124.0	66.4	–33.0	5.6
Paints and like compounds	661.5	227.3	37.6	8.9
Fertilizers	190.4	24.4	–32.3	–8.0
Oil and grease products	891.8	88.4	–31.3	–5.2
Allied industries	3,163.5	312.0	33.0	–4.8
Total	6,403.2	200.3	12.6	–0.5
All manufactures	62,718.4	163.1	1.0	0.1

Nothing could more clearly indicate the lack of unity in these "chemical" industries. The allied industries, most important of which are petroleum refining, manufactured gas, and coke, tend to dominate the picture. In general, there appear to be two distinct groups. Raw chemicals, medicines, and paints have moved steadily forward, all increasing at each point more than industry as a whole. Their progress has been particularly marked since the war. But explosives, fertilizers, and the products of animal and vegetable oils and greases have by no means fared so well.

Value of Total Output Increased

The fact that these figures are based on the value of products means that they may be affected either by price changes or by variation in volume. In general, prices in 1919 were 110 per cent higher than in 1914, and 162 per cent higher in 1925. Between 1925 and 1927, there was a drop in prices of about eight per cent. An industry which succeeded in increasing the value of its total output in the face of this decline might well deem itself fortunate. The group manufacturing medicines, perfumes, etc., with its gain from 1925 to 1927 of over 16 per cent ranks near the top for all manufacturing industries in recent rate of growth.

One additional type of information can be drawn from the census material, relating to the change in the size of factories during the period. The size can be measured in terms of wage earners, horsepower, or value of products. All three are presented in the following table:

	Wage earners		*Horsepower per establishment*		*Value of Products*	
	1914	*1927*	*1914*	*1927*	*1914*	*1927*
Raw chemicals	72.3	87.5	553.7	957.3	514.0	796.3
Medicines, perfumes, etc.	12.9	15.2	16.8	27.3	86.3	234.4
Explosives	113.0	96.0	342.2	363.6	441.0	794.7
Paints and like compounds	18.9	20.7	82.9	124.1	160.7	365.1
Fertilizers	31.0	30.0	155.2	251.6	208.5	306.6
Oil and grease products	26.8	32.6	188.7	303.3	257.8	605.4
Allied industries	56.5	101.9	287.0	1,087.9	436.5	2,150.6
Total	33.8	44.2	177.3	394.6	256.6	716.3
All manufactures	39.0	43.5	126.2	203.4	135.1	326.0

It is perhaps surprising to learn that, whereas the chemical industries as a total have payrolls almost exactly equal in size per plant to those of all manufacturing industries, their equipment in terms of horsepower per plant is considerably larger, and the value of the products per plant is more than double that of the average manufacturing establishment. Furthermore, both horse power and value of products are increasing at a much more rapid rate than is industry in general.

But once more a discussion of the total may be misleading. The tremendous expansion of the so-called allied industries are very important factors in the totals. If the industry groups are examined separately, it appears that the group manufacturing medicines, perfumes, cosmetics and the like, is an exceedingly small scale industry. Although the establishments in this industry have grown somewhat during the period from 1914 to 1927, the growth was in the early part of the period. While the value of products per establishment increased considerably from 1925 to 1927, there is no corresponding increase in either wage earners or horsepower. The same cannot be said of the paint and similar products group, where there is more evidence of the introduction of machinery in the last few years. Furthermore, it should be noted that, although both the number of wage earners and the amount of horsepower per products exceeds that of the average establishment.

Vigorous Growth of Chemical Industry

In summary, the chemical industry is no exception to the general trends now evident in industrial development. But it records more vigorous development than is seen throughout industry as a whole. While the number of wage earners for manufacturing as a whole reached its peak in 1923, the number engaged in the chemical industries continues to advance, though slightly. In terms of horsepower, the development throughout industry has been extraordinary, but it has been even more rapid in the chemical industries. But, just as in the picture of all manufactures, there are variations among the various parts. The chemical industries have not all shared equally. But no check is yet in evidence on the steady advance of those divisions known as raw chemicals, medicines and the like, and paints and similar products. They are becoming yearly more and more important parts of the total of our national manufacturing industry.

Determining the Flashpoint of Solvents and Plasticizers

By Ernest von Muehlendahl, Dipl.-Eng.
Constance.

As a very useful compilation of data on the flashpoint of materials entering into lacquer manufacture, this work has been translated for the readers of CHEMICAL MARKETS by The Solvents Institute, Inc., from "Farben - Zeitung" 1928-29, Vol. 34, pp. 1427-1429.

REFERENCES to the flashpoint of many substances, particularly of rare ones, are difficult to find in literature and are frequently contradictory. Since the German Railway System has decided to determine flashpoint with a Penski—Abel apparatus, it has seemed advisable, to make some communication on the determination of the flashpoints and to collect and separate the known values carefully. Special attention has been given to the solvents and plasticizers important in lacquer manufacture. Lubricating and burning oils are not considered in this paper; the methods and apparatus for the determination of flashpoints of these substances having already been investigated rather thoroughly and frequently classed.

Flashpoint means the temperature at which the air, present above the substance to be examined, contains sufficient amounts of the vapors of the substance to cause a continuation of the combustion introduced into the air vapor mixture, without further heat supply. One distinguishes between a lower flashpoint, with an excess of air, and an upper flashpoint, with an excess of the vapors of the combustible substance. In the following only the lower flashpoint will be considered.

It is not possible, to date, to give a theoretical explanation of the flashpoint or to bring it into any relation with some other physical or chemical constants of the substance in question. The definition indicates that the flashpoint is a function of the vapor pressure. However, the heat of combustion, the specific heat and specific volume also play a role therein, so that it is not yet possible to construct a plain equation. W. Ormandy and E. Craven have found the empirical formula that the quotient of flashpoint and boiling point—expressed in absolute temperature—is 0.736. Benzol, for instance, has the flashpoint —11°C =261° abs. (273-11) and a boiling point of 80°C =353° abs. (273 +80); the quotient 261:353 is 0.736. This formula, however, is only applicable to hydrocarbons, other substances showing more or less considerable deviations. E. Mack, C. Boord and N. Barham state that the vapor pressure of the liquid at the flashpoint is so high, that the amount of oxygen present in the vapor-air mixture is exactly twice what is necessary for a complete combustion. This rule, too, is only applicable to hydrocarbons. W. Ormandy and E. Craven have made experiments under the influence of pressure and found thereby that the flashpoint rises with increasing pressure according to the following equation:

$$FP = A \lg p + B$$

FP stands for flashpoint in C°, p for pressure, A and B for constants, A being about the same for all substances, the value of B varying for each substance. All these methods were found empirical and do not warrant a theoretical explanation. For example, it is not conceivable why there should be twice the amount of oxygen present in the combustion than necessary, and why, with a larger excess, the combustion is not continued.

To determine the flashpoint, the substance to be examined is heated evenly, and a flame brought to its surface from time to time. The temperature at which the flame is propagated in the air above the moisture, is designated as flashpoint. D. Holde and E. Foerster give descriptions of apparatus in use at the present time. The most simple are open crucibles with thermometers placed therein, which are heated by some kind of a heat bath. A gas flame is passed above this from time to time. Closed crucibles are the approved accessories; there are exact directions for their dimensions and handling. The values obtained by means of various apparati often show a discrepancy of more than 100° C. The reason therefore lies probably chiefly in that the conditions at which the experiments are made are not alike. Above all, it is difficult to obtain the space above the liquid really containing as much vapor as corresponds to

FLASHPOINT TABLE

In the first column of the table the empirical formula is given, in the second the name or the names of the substances examined, in the third the flashpoint (in °C.) in the air under atmospheric pressure; in the fourth column the literature references mentioned in the article are indicated.

I. PURE SUBSTANCES

1. Hydrocarbons

C_6H_{14}	Hexane	—31	6
		—18	7
C_7H_{16}	Heptane	—1	6
C_8H_{18}	Octane	+17	7
C_6H_6	Benzol	—12	6
		—9	7
C_6H_{12}	Cyclohexane Hexahydrobenzol	—17	6
C_7H_8	Toluol	+10	6
		+6	7
		+4	8
C_7H_{14}	Methylcyclohexane, Hexahydrotoluol	—4	6
C_8H_{10}	Ethyl benzol	+16	7
C_8H_{10}	Xylol	+29	6
C_8H_{16}	Hexahydroxylol	+11	6
C_9H_{12}	n-Propyl-benzol	+30	7
C_9H_{12}	i-Propylbenzol, Cumol	+52	7
$C_{10}H_{14}$	Sec-Butylbenzol	+52	12
$C_{10}H_8$	Naphthalene	+86	6
$C_{10}H_{12}$	Tetrahydronaphthalene, Tetralin	+78	5
$C_{10}H_{18}$	Decahydronaphthalene, Decalin	+58	12
$C_{13}H_{12}$	Diphenylmethane	+130	14

2. Alcohols

CH_4O	Methanol	—1	6
		+6	7
C_2H_6O	Ethyl alcohol	+11	6
		+9	7
C_3H_8O	n-Propanol	+21	6
		+22	7
C_3H_8O	i-Propanol	+14	7
$C_4H_{10}O$	n-Butanol	+38	6
		+36	7
$C_4H_{10}O$	i-Butanol	+28	7
$C_5H_{12}O$	i-Amyl alcohol	+44	6
		+40	7
$C_5H_{12}O$	tert-Amyl alcohol	+20	2
C_3H_6O	Allyl alcohol	+22	2
$C_3H_8O_2$	Methyl glycol	+36	14
$C_4H_{10}O_2$	Ethyl glycol	+40	14
C_7H_8O	Benzyl alcohol	+100	14
$C_8H_{10}O$	Phenyl ethyl alcohol	+102	14

3. Phenols

C_6H_6O	Phenol, Carbolic acid	+79	7
C_7H_8O	o-Cresol	+81	3
		+83	7
C_7H_8O	m-Cresol	+86	7
C_7H_8O	p-Cresol	+86	7
$C_6H_{12}O$	Cyclohexanol, Hexalin	+68	12
$C_7H_{14}O$	Methylcyclohexanol, Methylhexalin	+68	10
$C_6H_6O_2$	Pyrocatechin	+127	7
$C_6H_6O_2$	Resorcin	+152	7
$C_6H_6O_2$	Hydroquinone	+165	7
$C_{10}H_8O$	Beta Naphthol	+161	3

4. Esters

$C_3H_6O_2$	Ethyl formate	—20	7
$C_3H_6O_2$	Methyl acetate	—16	7
$C_4H_8O_2$	n-Propyl formate	—3	7
$C_4H_8O_2$	i-Propyl formate	—6	7
$C_4H_8O_2$	Ethyl acetate, Acetic ester	—5	7
$C_4H_8O_2$	Methyl-n-propionate	—2	7
$C_5H_{10}O_2$	n-Butyl formate	+18	7
$C_5H_{10}O_2$	n-Propyl acetate	+14	7
$C_5H_{10}O_2$	i-Propyl acetate	+4	7
$C_5H_{10}O_2$	Ethyl-n-propionate	+12	7
$C_5H_{10}O_2$	Methyl-n-butyrate	+14	7
$C_6H_{12}O_2$	n-Butyl acetate	+24	10
$C_6H_{12}O_2$	i-Butyl acetate	+18	13
$C_7H_4O_2$	i-Amyl acetate	+25	10
$C_5H_{10}O_3$	Methyl glycol acetate	+44	14
$C_6H_{12}O_3$	Ethyl glycol acetate	+47	14
$C_8H_{14}O_2$	Cyclohexyl acetate, Hexalin acetate	+64	10
		+58	13
$C_9H_{16}O_2$	Methyl cyclohexyl acetate	+64	11
$C_9H_{10}O_2$	Benzyl acetate	+102	14
$C_5H_{10}O_3$	Diethyl carbonate	+25	14
$C_7H_{14}O_3$	Ethyl-n-butylcarbonate	+50	14
$C_5H_{10}O_3$	Ethyl lactate	+47	10
$C_{18}H_{30}O_4$	Adipic acid dicyclohexyl	+196	13
$C_{12}H_{16}O_3$	Amyl salicylate	+132	14
$C_{14}H_{12}O_2$	Benzyl benzoate	+148	13
$C_{10}H_{10}O_4$	Dimethylphthalate	+132	13
$C_{12}H_{14}O_4$	Diethylphthalate	+140	13
$C_{16}H_{22}O_4$	Di-n-butylphthalate	+160	13
$C_{16}H_{22}O_4$	Di-i-butylphthalate	+161	13
$C_{14}H_{18}O_6$	Dimethylglycolphthalate	+187	14
$C_{16}H_{22}O_6$	Diethylglycolphthalate	+173	14
$C_9H_{12}O_3S$	p-Toluol sulphoacid ethyl ester	+158	13
$C_{14}H_{14}O_3S$	p-Toluol sulfoacid-o-tolyl ester	+184	13
$C_{18}H_{15}O_4P$	Triphenyl phosphate	+220	13
$C_{21}H_{21}O_4P$	Tri-o-cresylphosphate	+226	13

5. Other Oxygen Compounds

C_2H_6O	Dimethyl ether	—41	12
$C_4H_{10}O$	Diethyl ether, ethyl ether	—41	6
$C_{12}H_{10}O$	Diphenyl oxide	+115	14
$C_{14}H_{14}O$	Dibenzyl ether	+135	13
$C_2H_4O_2$	Acetic acid	+44	1
$C_7H_6O_2$	Benzoic acid	+121	3
		+131	7
C_7H_6O	Benzaldehyde	+62	3
C_3H_6O	Dimethyl ketone, Acetone	—18	6
		—14	8
C_8H_8O	Phenylmethyl ketone, Acetone phenone	+105	14
C_6H_8O	$\triangle_2$-Cyclohexanone	+34	13
$C_6H_{10}O$	Cyclohexanone	+64	10
		+44	13
$C_7H_{12}O$	Methylcyclohexanone	+48	13

6. Halogen Compounds

$C_2H_4Cl_2$	Dichloroethylene	+17	12
$C_4H_7O_2Cl$	Chloroethyl acetate	+67	12
$C_4H_7O_2Cl$	Ethyl chloroacetate	+54	12
C_6H_5Cl	Chlorobenzene	+29	3
C_6H_5Br	Bromobenzene	+65	12
$C_6H_4Cl_2$	o-dichlorobenzene	+77	12
$C_6H_4Cl_2$	p-dichlorobenzene	+67	3

7. Amines

C_6H_7N	Aniline	+72	5
		+64	8
$C_8H_{11}N$	Dimethyl aniline	+61	3
C_7H_9N	o-Toluidine	+87	3
$C_8H_{11}N$	Xylidine	+97	1
$C_{12}H_{11}N$	Diphenylamine	+153	3
$C_{10}H_9N$	alpha Naphthylamine	+157	3
$C_{10}H_3N$	Ethyl acetanilide	+108	13
$C_{14}H_{16}O_2N$	Dianisidine	+206	3
$C_{17}H_{20}ON_2$	Diethyl diphenyl urea	+150	13

8. Nitro Compounds

$C_6H_5O_2N$	Nitrobenzol	+89	3
		+88	7
$C_6H_4O_2ClN$	p-Nitrochlorobenzol	+127	3
$C_7H_7O_2N$	p-Nitrotoluol	+106	3
$C_6H_4O_4N_2$	m-Dinitrobenzol	+150	3
$C_6H_3O_4ClN_2$	Dinitrochlorobenzol	+187	3
$C_{10}H_7O_2N$	alpha Nitronaphthaline	+164	3

9. Other Substances

CS_2	Carbon disulfide	—26	7
		—40	8
		—20	10

II. BINARY SYSTEMS

Toluol +	Benzol		
90%	10%	+5	3
80%	20%	+2	3
60%	40%	—3	3
50%	50%	—5	3
30%	70%	—8	3

Methanol +	Water		
90%	10%	+13	2
80%	20%	+17	2
70%	30%	+20	2
60%	40%	+23	2
50%	50%	+26	2
40%	60%	+30	2
30%	70%	+36	2
20%	80%	+44	2
10%	90%	+59	2

Ethyl Alcohol +	Water		
95%	5%	+14	
90%	10%	+16	
80%	20%	+18	
70%	30%	+20	
60%	40%	+22	By graphic interpolation of the values present.
50%	50%	+25	
40%	60%	+28	
30%	70%	+32	
20%	80%	+40	
10%	90%	+54	

n-Propanol +	Water		
90%	10%	+28	2
80%	20%	+30	2
70%	30%	+31	2
60%	40%	+31	2
50%	50%	+32	2
40%	60%	+32	2
30%	70%	+32	2
20%	80%	+34	2
10%	90%	+42	2

i-Propanol +	Water		
90%	10	+15	2
80%	20	+17	2
70%	30	+19	2
60%	40	+19	2
50%	50	+20	2
40%	60	+20	2
30%	70	+22	2
20%	80	+29	2
10%	90	+49	2

Allyl Alcohol +	Water		
90%	10%	+26	2
80%	20%	+28	2
70%	30%	+28	2
60%	40%	+29	2
50%	50%	+30	2
40%	60%	+30	2
30%	70%	+30	2
20%	80%	+33	2
10%	90%	+42	2

III. Ternary Systems

Ethyl Alcohol (95%) +	Benzol		
75%	25%	—8	3
50%	50%	—12	3
25%	75%	—12	3

Ethyl Alcohol (95%) +	Ether		
90%	10%	—10	3
80%	20%	—21	3
70%	30%	—28	3
50%	50%	—35	3
30%	70%	—38	3

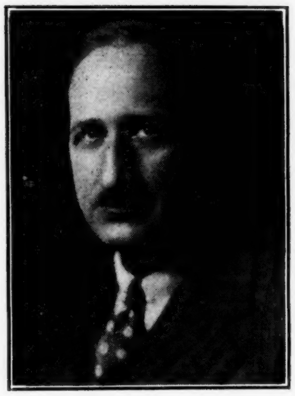
the vapor pressure at the flashpoint. Particularly with open apparati the slightest draught is able to cause great errors by removing some vapor and supplying fresh air. Furthermore, attention should be given to the fact, that the liquid and the vapor must be kept at exactly the same temperature. Also the speed of heating and the type of igniting flame play a certain part, though the deviations caused thereby are not considerable. In order to obtain values which are well reproducible, the apparatus of Ormandy and Craven seems to be suitable. It consists of a glass container closed on all sides with a space for the liquid, small as compared to the vapor space, and surrounded by another container, through which a cooling or heating liquid is conducted, as may be required. Ignition occurs by electric spark. Most of the values of these tables were obtained with this apparatus.

The determination of the flashpoint of liquid mixtures is particularly complicated. Besides the aforementioned conditions, the varying relation between liquid and vapor space causes discrepancies. From mixtures containing small amounts of readily flammable substances, these will evaporate first. If the vapor space is small, they are contained therein in comparatively high concentration, thus giving a low flashpoint; with large vapor space their concentration will be a small one, so that their flashpoint is higher. It is, therefore, absolutely necessary to give a minute description of the apparatus applied in furnishing the flashpoint of mixtures, else the values cannot be compared to others.

In the accompanying table some figures for values of flashpoints of some solvents and plasticizers are given. The data are taken from: 1. F. Gannter. Chem. Techn. Report. 1887, 65; 2. P. Raikow. Chem. Ztg. 26, 436, 1902; 3. W. Ormandy and E. Craven. Jour. Inst. Petroleum Techn. 8, 145, 1922; 4. F. Seeligmann and E. Zieke. Handbuch d. Lack-u. Firnis-Industrie, 3rd edition, Berlin 1923, pp 800; 5. W. Ormandy and E. Craven. Jour. Inst. Petroleum Techn. 9, 33, 1923; 6. W. Ormandy and E. Craven. Chimie et Industrie Spec. No. 226, May 1923; 7. E. Mack, C. Boord and N. Barham. Ind. Eng. Chem. 15, 963, 1923; 8. H. Strache. Oesterr. Chem. Ztg. 27, 19, 1924; 9. D. Holde. Kohlenwasserstoffoele u. Fette, 6th edition, Berlin 1924, pp 127; 10. N. Heaton. Volatile Solvents and Thinners. New York 1926, pp 152; 11. H. Wolff. Die Loesungsmittel der Fette, Oele, Wachse u. Harze. 2nd edition, Berlin 1927, pp 253; 12. International Critical Tables, Vol. 2, New York 1927, pp 161; 13. A. Noll. Farben Zeitg. 32, 1553, 1927; 14. A. Noll. Farben Zeitg. 33, 1166, 1928.

Titanium Dioxide ---

A Revolutionizing Factor In the Pigment Market



By Everett W. Boughton
Manager, Paint Department, R. T. Vanderbilt Co.

THE most interesting pigment development of the last few years has been in the field of titanium dioxide products. These are white pigments and are used extensively in paints, enamels, lacquers, lithographing finishes and other miscellaneous protective and decorative coatings, supplementing and, in some cases, replacing the older white pigments, white lead, zinc oxide and lithopone.

The first titanium pigment to be produced on a large scale was the combination of titanium dioxide and barium sulfate. Later this was followed by the combination pigment containing calcium sulfate. Within the last two years pure titanium dioxide has been developed and marketed and its advent lead to a fourth pigment, containing titanium dioxide and lithopone.

Making Pure Titanium

Pure titanium dioxide is made from ilmenite which is treated with sulfuric acid. The product of the reaction is a brown mass which is agitated with water, yielding a solution of ferrous sulfate and titanium sulfate. Metallic iron is added to insure all the iron being in the ferrous condition. The solution is diluted, and by cooling, ferrous sulfate is precipitated. After the removal of this latter compound by centrifugals, the titanium dioxide is precipitated by a patented process. The precipitate is removed by filtration, washed free from mother liquor and again filtered-off. The pulp is dried, calcined, and ground, the resulting product being titanium dioxide in pure form.

Although all the white pigments are white, and although they are all used for the manufacture of white and tinted products, they differ considerably when used in white coatings, in (1) degree of "whiteness," (2) hiding power and tinting strength and (3) various miscellaneous characteristics such as durability, permanance of color, type of failure, etc. They also differ widely in specific gravity. The latter is an important point from an economic standpoint as pigments are purchased by the pound and the finished paint or other coating is sold or used on a volume basis. The lower the specific gravity the better from a cost standpoint. The titanium pigments stand at the top of the list for low specific gravity. Too often the matter of bulking value is disregarded. No pigmented product is good solely because it is heavy and neither gallon weight nor specific gravity is a true guide for quality. In those cases when equal or better results can be obtained with products of light weight, why should extra difficulty of handling and extra freight be added through the use of heavy materials ?

The chief difference between the older pigment and titanium dioxide products is that the latter have greater hiding power and tinting strength. The relative hiding powers of two white pigments are not necessarily in the same ratio as their tinting strengths, and both hiding power ratios and tinting strength ratios vary with different paint or lacquer formulae and with methods of laboratory tests. Therefore, we cannot give definite figures which truly show any general, practical and accurate relative values of the white pigments. Each particular paint or lacquer presents a separate problem as to what pigments and how much of each should be used.

Opacity of White Pigments

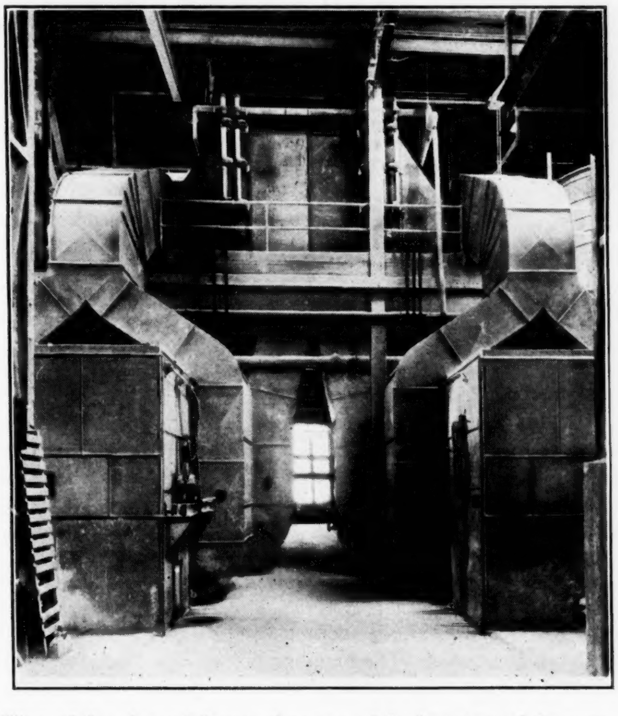
When white pigments are used with oils, gums, varnishes or similar binding materials, as in paints, enamels, etc., the opacity of the coating depends mainly on the refractive indices of the binder and of the pigment. The usual binders have about the same refractive index, this being lower than those of the white pigments. The higher the refractive index of the pigment, the greater will be the refraction or bending of the light rays as they pass from binder to pigment particle and again to binder, and the greater the opacity of the film. Pure titanium dioxide has a refractive index of 2.76, higher than that of any other white pigment. The fineness of the pigment also influences hiding power, and the finer it is the better the opacity down to a certain point. In fineness, zinc

oxide is first and white lead is the coarsest. Within the range of commercial fineness, however, variation in this respect is much less of a factor than refractive index.

The titanium pigments have come into general use primarily because of good color, high hiding power, chemical inertness and resistance to sunlight and sulfurous gases. Good color is particularly noticeable in the titanium lithopone and the pure titanium dioxide, and hiding power in the case of the pure oxide, which far and away leads the field in this respect.

Some white pigments when mixed with certain varnish or lacquer gums may darken on exposure to sunlight, and others darken through exposure to the sulfurous fumes of industrial communities. All the titanium pigments are immune from these troubles.

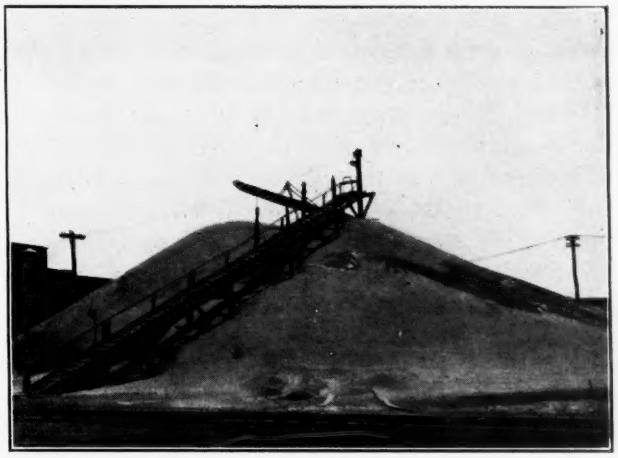
In any white or tinted coating job, whether it be to paint a house, or lacquer an automobile, or lithograph a can, we apply one or more coats to (1) cover completely the underlying surface, (2) produce smoothness and uniformity of finish, and (3) obtain durability. If we can accomplish the same or better results with a reduction in the number of coats, we have materially reduced costs. The use of titanium dioxide pigments has done this, particularly through utilizing the great strength of the pure titanium dioxide to obtain good one-coat jobs. For enamels, lacquers and



View of the pigment dryers where one of the last steps of the manufacturing process takes place.

specialties, the use of titanium pigments is growing rapidly. The one-coat repaint in painting a house is now perfectly feasible with titanium pigment paint, and with pure titanium dioxide the development of a one-coat paint for the bare wood of new construction is not an impossibility.

The proper formulation of white coatings almost always results in the use of more than one pigment. The titanium pigments are good mixers and can be safely used with white lead or zinc oxide or lithopone. In such mixtures the titanium pigments (especially pure titanium dioxide) can be used to reinforce the



Storage of ilmenite, the raw material for titanium pigments, which is shipped to this country from Travancore Beach, India.

weaker ones or conversely, relatively small amounts of such pigments as white lead and zinc oxide can be used in products which are based on the titanium pigments in order to produce certain desired effects of hardness, drying, etc.

The so-called fillers, china clay, talc, whiting, etc. have never been used as the main base pigments of house paint, the filler content being kept down to about 15 per cent. As they have little or no opacity when mixed with oils, the use of large amounts has heretofore meant that they would not hide properly. The introduction of pure titanium dioxide may change this as it is so strong that even though the filler predominates in the mixture, the hiding power is excellent. It is possible that this will lead to a much larger use of the fillers.

One bugbear of white paint, namely change in consistency in the can, is largely eliminated by the use of the titanium dioxide pigments. The latter do not react with varnishes or gums to form soaps and the paint remains at the same "body."

The growing use of nitrocellulose lacquer for industrial finishing (automobiles, furniture, refrigerators, etc.) has opened a wide field for the titanium pigments. In a lacquer only a small amount of pigment per gallon can be used. In a gallon of house paint we put about twelve pounds of pigment, in an enamel about five pounds, but in a lacquer only about one and one-half pounds. In lacquer, for purpose of durability, lustre, etc., certain pigment—vehicle binder ratios must be maintained, the binder being nitrocellulose, gum, etc. The quantity of binder per gallon is kept low by viscosity requirements, so the pigment content must be small. In whites and tints the titanium pigments yield lacquers of adequate

hiding power, which is not the case with the weaker pigments, and here the high opacity of pure titanium dioxide is of great value. One to one and one-half pounds of this pigment per gallon of white lacquer has given results which were never previously obtained.

Hiding Power of White Pigments

The general subject of the hiding power of white pigments is of outstanding interest from a practical standpoint. In many coating jobs, particularly in house painting, the cost of the labor far exceeds that of the coating material. Extra material cost through the use of strong white pigments is therefore amply justified if one or more coats are eliminated—and they are by the use of the right pigments. The manufacturer of paints or enamel or lacquer considers both cost and hiding power. No matter what pigments he uses he cannot increase hiding power without some increase in cost. He can reach a certain strength by using white lead, zinc oxide and lithopone, limited by the amount of pigment which the paint or lacquer will take, and if he wants a better effect he must use the group of combination pigments, titanium dioxide with barium sulfate or calcium sulfate or lithopone, or titanium dioxide with a filler. Should his requirements be still more rigid, and they frequently are—he turns to the pure titanium dioxide. Increased hiding power in a coating is well worth some extra material cost. It is economically advantageous if only through increasing the factor of safety. A coating can be formulated to meet certain minimum hiding power requirements, which means that at the prescribed spreading rate of so many gallons per unit area it will just do the job. However, no coating jobs, whether by brush, spray, dip or roller, are always uniform and free from defects. Faulty adjustments, careless work or improper surface conditions cause thin spots, places on the house or table or lithographed sheet where the coating is one-half or one-fifth of the normal thickness. In such cases if the coating material is made with a titanium pigment, it will have sufficient hiding power to cover at the thin spots, so that rejections, seconds and waste of time and material are eliminated.

Progress in White Pigment Production

A paint or a lacquer or an enamel is a complicated thing, each product containing a number of raw materials, and particular methods of use must be worked out for each new constituent that is added. It took time to work out the details for lithopone and china wood oil when they were newcomers twenty years ago. Paint and lacquer technology is advancing with accelerated step and new materials of the last two years, such as titanium lithopone and pure titanium dioxide, are handled more rapidly and more skillfully than would have been the case in 1909. All the titanium pigments are far beyond the experimental stage and are moving in carloads. Their properties are unique, their economic position is sound and they represent distinct progress in white pigment production. When we consider that in literally a few months pure titanium dioxide has changed from an interesting laboratory specimen to the backbone of high class coatings and that the manufacturers of all the titanium pigments are making progress month by month in reducing costs and improving quality, we can anticipate rapid development and expansion in the field of titanium pigments.

Return On Investment Too Small in German Chemical Industry

In the last few years the percentage of German chemical companies not paying a dividend has been as follows: 1925, 70 per cent; 1926, 55.8; 1927, 28.9; 1928, 20.5. The average dividend paid, the I. G. and the artificial silk producers being included, is as follows:—1925, 6.6 per cent; 1926, 6.6; 1927, 9.4; 1928, 9.9. If the I. G. and the artificial silk producers are left out, the dividends are:— 1925, 3.1 per cent; 1926, 3.7; 1927, 6.8; 1928, 7.1. These latter figures are regarded as indicating that, the I. G. and artificial silk producers excepted, the German chemical industry is giving a return below that which is normally expected at the present time. The writer of the German article quoted in the "Chemical Age" puts the normal safe dividend at 8-9 per cent, and considers that in view of the high risks of the chemical industry, the returns are too small.

In order to indicate the great significance of exports for the dividend-earning power of the German chemical industry, the following figures for the total value of exports of chemical products from Germany may be quoted: 1925, 937 million marks; 1926, 1,020 million; 1927, 1,162 million; 1928, 1,318 million. These figures show a steady increase, and it is thought that this tendency will continue in the present year, for the value for the first half of 1929 was 709 million marks as against 623 millions in the first half of 1928.

World's potash production last year may be conservatively estimated as somewhat over 1,900,000 tons of actual potash, according to a report submitted to the Division of Fertilizer Chemistry, American Chemical Society. In the United States production amounted to 104,000 short tons potash salts, equivalent to 60,000 tons of actual potash, an increase of 38 per cent over that of the preceding year and valued at over $3,000,000. During the same period, however, 976,000 tons of potash salts of a total value of $22,500,000 were imported for domestic consumption. This represents an increase of 33 per cent. Thus, while there was a marked increase in domestic production, there was a corresponding increase in consumption which called for increased importations.

Polish production of ammonium sulfate has been increasing rapidly in recent years, from 22,989 metric tons in 1927 to 36,927 metric tons in 1928. This quantity is more than sufficient to supply the domestic demand, and gives a considerable surplus for export. Imports of ammonium sulfate, which in 1927 amounted to 3,104 metric tons, declined to 1,199 tons in 1928. Exports, on the other hand, rose from 11,519 tons in 1927 to 18,272 tonsin 1928.

I. G. Farbenindustrie and Vereinigte Glanzstoff are reported to be negotiating for a price agreement on rayon. Sales in Germany are said to be satisfactory but profits are small.

CHEMICAL STATISTICS

By S. J. Cook*
*Chief, Chemical Branch
Dominion Bureau of Statistics*

CHEMICAL statistics are numerical statements of facts, exclusive of financial accounts, which are used in the administration of chemical business. Such a study may relate not only to existing enterprise, but also to the search for new markets for known products, and to the investigation of existing markets at home and abroad, where, by the substitution of new products for old, additional trade may be developed. Chemical statistics are thus seen to be a branch of research.

Such statistics are of two general classes—(1) external statistics, generally available to the public, which indicate the general trend of business and market conditions, and (2) internal statistics, which are concerned with the private operations of an individual business establishment.

Examples of the first class are the statistics of manufactures, imports and exports, agriculture, transportation, public utilities, bank clearings, prices, and population. Internal statistics include those obtained from the sales, advertising and factory reports of an individual firm or company. Such records as these are indispensable to the proper conduct of a business; the degree of their development does not necessarily depend on the volume of business done; some concerns that enjoy a steadily growing trade owe their rise from relatively small beginnings to a recognized place in the commercial world very largely to the fact that a close statistical watch is continually kept on every branch of the business.

One of the amazing things in industry is the fact that large sums are often risked in enterprises undertaken upon guesswork and optimism. While some manufactures have been started only after a careful study of conditions, others have been instituted after only a few inquiries and the decision to take the chance. Much of this attitude, no doubt, is a legacy of the past. In the early days the manufacturer had but two problems: to make the goods; second, to get them to the consumer. To-day, supply in most lines has caught up with demand and a third very important function devolves upon the manufacturer—namely, to develop his markets.

A feature that is perhaps characteristic of the chemical industry is the invasion of synthetic products replacing the natural or accepted product of yesterday. That this is so, furnishes further reason for the study of chemical statistics. The replacement of natural indigo by the synthetic product is an old story; air nitrates are most recent competitors of Chilean saltpetre and ammonia from the by-product coke ovens; acetic acid, acetone and a host of other chemicals made from carbide are produced in competition with the time-honoured wood distillation products; a multitudinous variety of the newer alloys, such as magnalium and, more recently, Columbia metal, have not only replaced other older and better known metals in certain work, but have made possible many wonderful accomplishments in other enterprises, as, for example, in aviation.

Where a manufacturer of a long-established product is confronted by competition of this kind, necessity demands that he look to his methods and markets, if he is to continue in business. Happy is he who with commendable foresight has gathered about him a commercial research or statistical staff, whose activities enable him not only to keep abreast, but usually ahead, of the tendencies in trade. Such an organization, ably managed with a keen chemical research staff on the one hand and statisticians on the other, need never fear the competition of either home or foreign trade.

To say that knowledge is power is trite, but it is true. Knowledge is the foundation of modern merchandising regardless of product and, as competition grows more intense, it becomes more apparent that the chemical manufacturer must know in order to succeed.

But the manufacturer may say, "Why have a research department ? I have so many salesmen that if I want to know anything I ask them."

To this query there are two obvious answers. (1) First, because these men are salesmen they are specialists in that particular field; they are handicapped in getting an impartial view of the situation. They see a part of the truth too clearly to get a fair vision of the whole truth. Second, because the function of a research department is not only to answer questions, but to discover influences that are escaping the attention of the manufacturer and his sales organization. It is only natural that any organization which specializes on a certain phase of an industry should, in the gaining of intensive knowledge of that phase, lose something of the perspective

**Abstracted from an address made before the Twelfth Dominion Chemical Convention at Toronto, Canada.*

of the whole. A research department is therefore to supplement and broaden this specialized knowledge with pertinent information from allied fields. As competition in business has grown more acute there has been a greater necessity that every factor should be understood and every danger guarded against in order that success may be attained. Hence, there is an increasing necessity for research departments in business enterprises.

Utility of Statistical Research

A writer recently gave the following examples of the utility of statistical research. A certain manufacturer in the central west was interested primarily in breaking into New York markets; research showed him that, totally neglected at his own door, there lay a larger market, easier to get, and likely to prove more profitable than the coveted New York market; research showed another manufacturer that his distribution was far from uniform; another, that he was restricting his line to jobbers when the possible sale for his goods was almost confined to those stores which aimed to buy direct; another who sold only direct that a major portion of the opportunities in his field could be best reached through jobbing channels.

Granting the value of research work, the chief problem is "How may it be conducted to produce results commensurate with the expenditure?"

At first sight it might appear that the problem of the research department is to answer inquiries, but further study will show that in order to attain its greatest usefulness it must go considerably beyond the answering of questions and perform the higher functions of formulating questions which ought to be asked. When a manufacturer has formulated in his mind a question for which he seeks an answer, all his experience, reading and thinking are brought to bear upon its solution, and while a research department can accumulate data that will help him in reaching a conclusion upon that point it can perform a more valuable service if it can discover tendencies of which the manufacturer is not conscious, and ask him questions which will lead to new lines of thought.

Research work should not only be dominated by honesty of purpose, but it should be conducted from the student standpoint of truth for truth's sake. Lines of inquiry that appear likely to prove of practical value should, of course, be pursued, but that which appears academic should not be neglected, for it frequently happens that what appears to be academic turns out to be highly practical, while something which appears likely to be practical often turns out to have very little value.

The methods to be applied in commercial research are analogous to those used in science; namely, the gathering of a mass of facts, and then, with an abundance of data before one, proceeding cautiously from the general to the particular.

Some of the broader aspects, which should be borne in mind in formulating conclusions, may be suggested here. First, the tendency towards concentration. In utility lines, theoretically, a single concern, if it excels, would secure an entire monopoly; or if a manufacturer so perfected his manufacturing process that he would be universally acknowledged to have the most efficient article at the price, theoretically everyone would buy his products. Practically, one manufacturer can attain a very high degree of efficiency in manufacture, but another can develop near enough to his standard to be a competitor; and practically, there is a value in a name and there is a difference in public opinion. Hence, it seldom happens that in any line where there is no protection by control of raw materials or patents anyone does attain an absolute monopoly. However, in these lines there tends to be concentration down to a very small number of manufacturers unless freight conditions affecting raw materials or finished product necessitate a sectional distribution of plants.

Concentration in Chemical Field

In Canada, we are just beginning to see evidences of this concentration in the chemical field. Development of water power has led to a concentration of electrochemical industries in those areas where these water powers have been most developed; progress in the smelting and refining of the non-ferrous metals has led to the establishment in the vicinity of these large smelters of smaller industries utilizing the by-product from the smelters as their raw materials; in other fields there has been a concentration of control where a number of small plants have been merged into a strong financial organization, and as a result some of the weaker plants have been eliminated. In general, it may be said that industries must be fairly well established before any evidence towards concentration becomes apparent.

Second, convenience goods or shopping lines. If the manufacturer produces an article sold to the consumer, it is important to know to what extent it is bought by men and to what extent bought by women, for men and women purchase through different motives. It is of first importance to a manufacturer to determine in which classification his goods fall and to what extent either shopping or convenience buying is the prevailing motive. Upon this depends his method of sale.

Third, scope of the market. In general, it may be stated retail and jobbing figures are merely the measure of human wants and economic possibilities, and when once the fundamental principles have been ascertained the extent to which sectional, racial and industrial and climatic conditions modify these fundamental tendencies is understood, one may estimate with a fair degree of accuracy the probable market for a given section.

In estimating markets it should always be borne in mind that the potential market may be very different from the existing market. An industry which does not employ advertising may seem to have a small market, while if consumers were better informed, the market might be much enlarged. Or an industry which sells direct when it should use jobbers or vice versa, may fall materially short of satisfying its potential market. Hence, the potential market, though less tangible and therefore more difficult of study, offers the more important field for research work.

Fourth, seasonal sales. The manufacturer is usually conscious of the extent to which his sales are affected by seasons, but the graphing of the seasonal curves often proves interesting and of value in planning sales efforts.

Fifth, fundamental tendencies in the trade. The scope of a commercial research department is to ascertain that which is fundamental rather than to give attention to the ephemeral. This is a basic feature that must be continually borne in mind in statistical work.

All of these are examples of the applications that may be made of chemical statistics. In the assembly of useful data such as are required broadly to illustrate the trends in trade, the Bureau of Statistics seeks to meet the needs of economists, statisticians, and industrial executives, as well as to furnish the necessary data for the guidance of the Government in determining the most beneficial and satisfactory policies in matters relating to domestic and foreign commerce and to the financial structure of the nation's business.

A growing public appreciation of this service is apparent; whereas—in the earlier days, the Bureau had to struggle with a very general attitude of indifference and even antagonism on the part of commercial concerns, particularly in the completion of the necessary periodical questionnaires, there is now not only a diminution of reticence on the part of the manufacturers in this respect—there is even enthusiastic support of the Bureau and its work. Returns come in more promptly, making possible the earlier release of reports on the various subjects studied. More than that, there are almost daily offers of assistance in the collection of data.

This spirit of co-operation between the Bureau and the industries it serves is but an example of the breadth of chemical statistics. Not only production, imports and exports data are needed to give the chemical manufacturer and trader the information they require, but many other sources of commercial information must be brought to the co-operative support of these primary data, before adequate chemical statistics are obtained. It is an encouraging fact that the rise in appreciation of statistical research has been rapid. Such a development points inevitably to progress that must lead, if not to supremacy, at least to continued and ever-growing prosperity in chemical manufactures and trade.

Who's Who In Chemical Industry

Hagens, Jacob Frederick Carl, president, Great Western Electro Chemical Co. Born, Bremen, Germany, 16 May 1870; mar., Eliza K. Hugo, Honolulu, Hawaii, 15 July 1895; educat., Real Scl. to 1886, emigrated to Hawaii in 1886. Pacific Guano & Fertz Co., Honolulu and San Francisco, gen'l mgr. 1902-13; H. Hackfeld & Co., Ltd., Honolulu, vice-pres. in chg. sugar plantation affairs, 1914-18; Great Western Electro Chem. Co., pres., 1920 to date. Served in U. S. A. Quartermaster Corps, July to Dec. 31, 1918. Pres. Honolulu Cham. of Comm., (1917). Clubs: Bohemian, Olympic, Army & Navy, of San Francisco. Address: Gt. Western Electro Chemical Co., 9 Main St., San Francisco, Calif.

Kuttroff, Edwin, director, Verona Chemical Company. Born, N. Y. C., 10 Nov. 1877; educat., Mass. Inst. Tech. B. S. (chmn. engr.) Technische Hochshule, Charlottenburg, B. S.; La Sorbonne, & Ecole de Pharmacie, Paris. Verona Chem. Co., org., 1900 to date. Clubs: St. Andrews Golf, Lotos, The Riding. Hobbies: golf, riding, Address: Verona Chemical Co., N. Newark, N. J.

Merz, Eugene, treasurer, The Heller & Merz Co. Born, New York, 11 April 1869; mar., Elizabeth Stevens Walton, Allenhurst, N. J., 1915; educat., B. S., 1888; E. M., 1892. The Heller & Merz Co., asst. supt., genl. supt., treas., 1892 to date; The Ultramarine Co., N. Y. C., pres.; Natl. Coml. Title & Mortgage Guarantee Co., Newark, N. J., dir.; Federal Trust Co., Newark, N. J., dir. Memb., Amer. Chem. Soc., Soc. Chem. Ind. Address: The Heller & Merz Co., 503 Hudson St., New York City.

North, Clayton Olin, secretary, treasurer and development manager, The Rubber Service Laboratories Company and the Elko Chemical Company. Born, DuBois, Pa., 31 Oct. 1891; educat., Carnegie Inst. Tech., B. Sc., Ch.E. Republic Rubber Co., Youngstown, O., 1914-16; Goodyear Tire & Rubber Co., Akron, Ohio, 1916-21; Rubber Serv., Dec. 1921 to date. Maj., C. W. Res. Clubs: Chem. (N. Y.), Country (Akron), Kanahwa Country (Charleston). Author various papers and patents re compounding of rubber and acceleration of rubber vulcanization. Address: The Rubber Service Labs. Co., Nitro, W. Va.

Riley, James Johnston, president, Barium Reduction Corporation. Born, Larne, Ireland, 14 May 1873; mar., Jean Hervey, Maitland, Ont., Can., 27 May 1909; children, 2 sons, 1 dau.; educat., Montreal high schl. Northern Explosives Co., vice-pres., 905-11; Curtis & Harvey (Can.), Ltd., vice pres., 1911-17. Lt.-Col. Res. Cavalry, Canada, J. P. Dist. Montreal.. Clubs: Royal St. Lawrence Yacht, Montreal Amateur Ath. Assn. (life memb.) Montreal Hunt, Chem. (N. Y.), Edgewood Country (Charleston). Hobies: riding, yachting. Address: Barium Reduction Corp., Charleston, W. Va.

Saklatwalla, Beram D., vice-president, Vanadium Corporation of America. Born, Bombay, India, 19 July 1881; educat., Univ. Bombay, Univ. Berlin, Germany, Mining Acad., Berlin B.S., Dr. Eng., Charlottenburg, Germany. Amer. Vanadium Co., process chem., 1909-10; genl. supt., 1910-19; Vanadium Corp. Amer., vice-pres., 1919 to date. Grasselli Co., chem., 1894-99; Va. Iron Coal & Coke Co., furnace supt., 1899-1900; N. & W. Ry Co., chief chem., 1900-06; Mathieson Alkali Wks., chem., 1906-07; farmer and stock raiser, 1906-12; Mathieson Alk. Wks., chem. 1912-27; Amer. Sodium Co., 1927 to date. Hobbies: hunting, fishing. Address: Yerington, Nev.

Plant Management

CHEMICAL STONEWARE

as Plant Equipment

By Percy C. Kingsbury
Chief Engineer, General Ceramics Co.

CERAMICS is an interesting example of the development of a basic industry by the integration of a large number of related industries. A few decades ago Ceramics was considered to cover only the manufacture of clay products, the more important of which were brick, tile, terra cotta, sanitary fixtures and drain pipe for building construction; cooking utensils and table ware for domestic purposes; art pottery; and in the industrial field, stoneware for the chemical industry, porcelain for the electrical industry and fireclay refractories. To-day the ceramic industry comprises the manufacture not only of these clay products but also of such materials as glass, enameled metals, abrasives, cements, limes and plasters, gypsum, dental cements, fused quartz, sillimanite, steatite and special refractories such as magnesite, chromite, bauxite, zirconia and other rare earths. This covers so wide a range that even the term silicate industry is not broad enough to cover the entire field.

Physical Properties of Chemical Stoneware

	1921	*1928*
Ultimate Compressive Strength, lbs. per sq. in.	**65,000**	**113,000**
Ultimate Tensile Strength, lbs. per sq. in.	**1,500**	**4,200**
Modulus of Elasticity, lbs. per sq. in.	**$8x10^6$**	**$5.9x10^6$**
Thermal Conductivity (B. T. U.)	**0.81**	**2.05**
Specific Heat	**0.188**	**0.199**
Linear Expansion per 1 deg. F	**$2.7x10^6$**	**$1.95x10^6$**

Empirical Tests for Comparison of Physical Properties of Chemical Stoneware

	1921	*1928*
Ultimate Bending Strength	**525**	**1,355**
Ultimate Torsional Strength	**298**	**327**
Hardness (ball pressure)	**800**	**1,007**
Resistance to Impact (swinging hammer)	**1.5**	**4.7**
Toughness (loss of weight in tumbling barrel)	**6.5**	**2.6**
Resistance to Abrasion (loss of weight under sand blast)	**5.0**	**2.0**

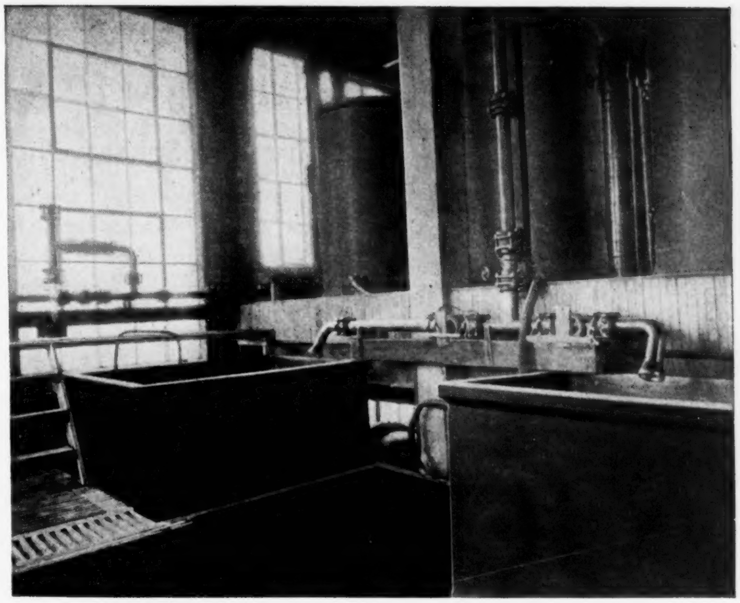
Ceramics may perhaps best be defined as the elaboration of minerals of an earthly nature. For our purpose we will consider ceramics in its narrower sense as the art of forming from plastic clay, shapes of beauty or utility and hardening them by fire.

In practically every part of the world, as the life of primitive man evolved from savagery into some sort of social order, we find evidence of the beginning of a crude ceramic art. The making of articles from plastic clay is one of the earliest indications and sometimes the only permanent one, of the dawn of civilization among prehistoric people Contrary to the popular conception, this primitive art cannot be accredited to any particular location as it developed along closely parallel lines in all parts of the world, the difference between vari-

ous specimens of prehistoric pottery being due more to variation in the available raw material rather than in the technique of the potter.

As methods of transportation developed, the potter became less dependent on local raw materials and his work began to express more freely his own individual taste and culture. Thus it is that ceramic ware reflects in many ways the national characteristics of the country in which it is produced and to a certain degree this is true of industrial ceramic ware, although the internationalization of industry in recent years has obscured these characteristics.

It was realized at an early date that the unique properties of ceramic ware could be put to important uses in the industrial field and along before the Christian era a dense stoneware of excellent quality was in general use for supplying water to settlements throughout the Roman Empire.

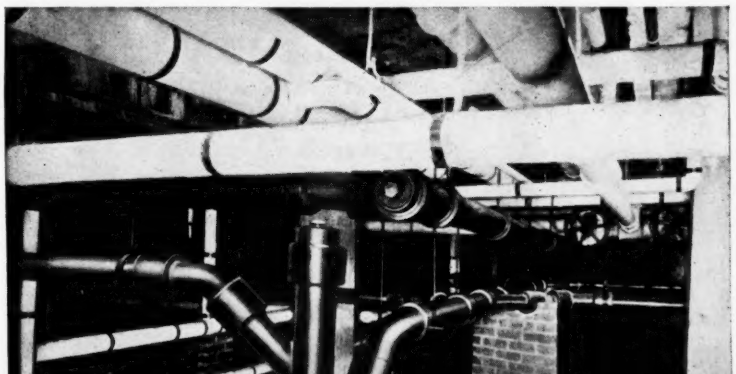


Showing installations of stoneware piping and miscellaneous stoneware equipment in a New England textile mill

Today we find in every industrial country an immense consumption of ceramic ware for technical purposes in which advantage is taken of its remarkable resistance to high temperature, to electrical stress, to abrasion and to chemical action. Each of these properties finds important industrial application in the form of fireclay refractories, electrical porcelain and chemical stoneware. To the chemical industry the most valuable of these products is chemical stoneware by reason of its resistance to extremely corrosive substances that attack most other materials. It has further advantages to the chemical industry in its mechanical strength, comparatively low cost of production and the facility with which it can be formed into very large shapes of almost any desired design.

Chemical ware resembles porcelain in many respects but is made from clay bodies having greater plasticity, less shrinkage, a lower temperature of vitrification and much greater mechanical strength before firing.

On account of the uniform texture of the material it can be accurately machined and polished and this feature makes it possible to manufacture in chemicalware all kinds of machinery for the handling of corrosive products. For example, exhaust fans and blowers for use in chemical plants for handling chlorine, sulfur dioxide, oxides of nitrogen, hydrochloric acid and hydrogen sulphide are made in capacities up to 6,000 cubic feet per minute, and larger sizes can be made to order. These fans are also used to a large extent for ventilating chemical laboratories, plating shops, metal pickling rooms and other industrial establishments where noxious gases are evolved. Chemicalware pumps in capacities up to 1,000 gallons per minute or more are available for handling nitric, phosphoric, muriatic, sulfuric, sulfurous, arsenic, acetic and other acids, chlorinated brine, sodium hypochlorite, peroxide of hydrogen and tin tetrachloride. These pumps are also used by the food industries for handling fruit juices and vinegar. Pebble mills up to 250 gallons capacity or larger are made for grinding drugs, chemicals and pharmaceutical products. These mills are used in our own plants for the preparation of glazes.

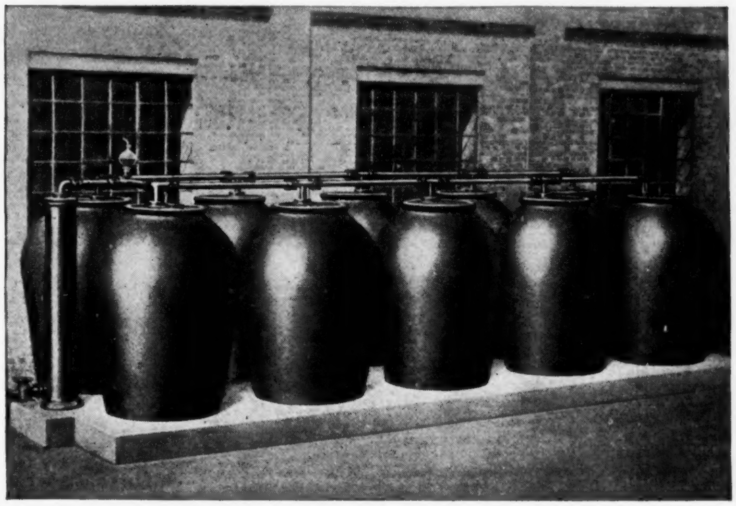


Stoneware drain lines at Yale University. New chemistry buildings at Yale and Harvard are equipped throughout with stoneware sinks and drain lines.

An immense amount of chemicalware was supplied during the war for equipment used in the manufacture of explosives and poison gas and the remarkable increase in the use of this ware in the past decade is no doubt due in part to the large number of people who became familiar with its use at that time. For the manufacture of many cor-

rosive substances it has completely replaced such materials as lead, iron, copper, brass and other metallic alloys, enameled ware, rubber, wood, granite, soapstone and glass. It is inexpensive compared with most of these alternative materials and when once properly installed is practically indestructible. Cosequently it is the standard practice in most chemical plants, where acids and other corrosives are manufactured, to use it to the fullest possible extent.

The advantages of this ware are also being realized more and more by the very large number of process industries that use these corrosive substances. This is to be expected, as the material in which a product is manufactured is obviously equally satisfactory for handling that product. However, in many industries, especially where there is little or no chemical supervision, it has been found when attempting to introduce the use of chemicalware, that there is a considerable amount of conservatism or inertia to be overcome before the established practice of years can be changed.



Installation of large stoneware containers for storing muriatic acid in carload lots.

For example, a New England textile mill is or was until recently, using heavy brass pipe for handling a solution of sodium hypochlorite. The resulting corrosion clogged the pipes so that they had to be scraped out at regular intervals, special cleanouts being furnished in the brass pipe-line for this purpose. Maintenance charges must necessarily have been extremely high due to constant leakage and frequent renewals, but the fact that this was the practice in the old country fifty or more years ago was considered ample justification for maintaining these intolerable conditions. By replacing this pipe by chemicalware—the material in which the bleach was actually manufactured—all this expense and nuisance would have been avoided at less cost than for the metal piping and the equipment would have required no further attention.

This, of course, is an exceptional instance as chemicalware piping, valves, pumps and other ceramic equipment are used to a very considerable extent in most of the newer and more progressive textile mills.

I have referred specifically to the textile industry but the same remarks are applicable to practically all industries in which corrosive materials are handled. These include, among many others, metal plating and galvanizing, tanning, photography, photo-engraving, storage battery manufacturing, oil refining, the manufacture of pulp and paper, rayon, explosives and the equipment of chemical laboratories.

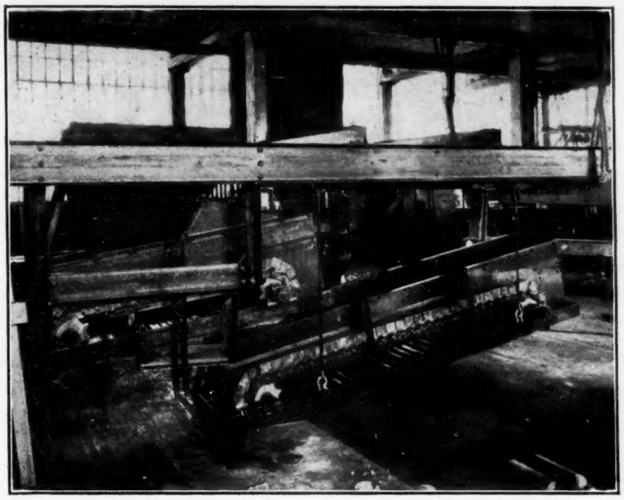
The use of clay products for chemical purposes is of course as old or older than industrial chemistry, but the fabrication of ware for this specific purpose is less than 100 years old the first plant having been build in Germany in 1836. At first the chemical manufacturer had to make his needs conform to what the potter was able to fabricate and consequently some of the earlier stoneware apparatus was very poorly adapted for the purpose for which it was to be used. To-day it is possible to duplicate in clay practically any kind of factory equipment that can be made of metal, modified of course to allow for the differences in the physical characteristics of the two materials. It is also possible to meet practically all the demands that the chemical manufacturer makes on the ceramist although these requirements become more and more stringent as the chemical industry expands. Only by constant experimentation in the laboratory and in the plant has it been possible for the potter thus to keep ahead of the demands on his ware and the results of this work can best be illustrated by the comparison of the characteristics of the ware of to-day with that made only eight years ago.

Vitrified clay is the most enduring of all materials made by the hand of nature or of man and it offers unlimited possibilities to the chemical industry as a permanent and inexpensive material for the construction of chemical plant and equipment. In the manufacture of ware for industrial chemical purposes, ceramics has kept pace with the remarkable improvements and developments that have taken place in other industries during the past twenty years.

Armstrong-Newport Co. plans construction of $1,000,000 plant at Pensacola, Fla., for commercial manufacture of insulation board. Company was formed jointly by the Newport Co. and Armstrong Cork & Insulation Co., after experiments in the manufacture of insulation board from extracted pine wood. The Newport Co. will conduct manufacturing operations, while the Armstrong company will sell the product.

Du Pont Viscoloid Co. begins construction of addition to Leominster plant. Additional installation estimated to cost about $1,000,000 will be completed in summer of 1930.

Roessler & Hasslacher Chemical Co. plans one-story addition to Niagara Falls plant to cost approximately $35,000.



WEIGHING *While* CONVEYING

By H. Bandstra
Richardson Scale Company

THE control of a chemical plant to-day is accomplished largely through weight of materials. The raw ingredients are first weighed to obtain an accurate check on costs. The materials are checked at various points in the processes and the best control is by weight. Where the finished product is sold in bags, barrels, or other containers the measure of weight is employed.

The Weighing-Conveying System

The demand for an accurate means of weighing and controlling materials in chemical plants, cement mills and similar operations, has been met by an ingenious and modern system which conveys the materials at the same time it weighs them. The system consists primarily of two conveyors—one feeder conveyor and one weighing conveyor—the weighing conveyor being suspended on scale levers. Material is delivered to the feeder apron through a top hopper of suitable size. This feeder, driven by motor, feeds materials to the weighing conveyor until the predetermined amount has been deposited on the weigh conveyor. The weighing conveyor—driven by its separate motor—being hung from scale levers, sinks slightly under the weight of the material and in so doing operates a switch which "cuts out" the motor driving the *feeder* conveyor. The weigh conveyor motor operates continuously and each weighing is made in a stream and not in one huge mass as occurs when the hopper type of automatic scale is used. This allows the weighing to be discharged in an elongated stream, reducing dust. Where two or more materials are proportioned, this provides a very even and intimate mix of the ingredients. By using enclosing covers for the conveyors, dust arising from such light materials as light soda ash, pitch, butt dust, ammo-phos, etc. is confined and a clean working installation is provided.

Each weighing is "fed off" the weighing conveyor in an elongated stream. A part of the weighing is discharged before the beam rises, cutting in the feeder conveyor motor. So that each weighing is separate and distinct from each other and there can be no intermixing of weighings.

The feeder, hopper mentioned above, is pivoted and can tilt forward or backward according to the supply of material. Thus when the supply diminishes to a point where accuracy cannot be maintained, the hopper tilts forward and in so doing actuates a mercoid switch, stopping the entire machine. As soon as enough material has accumulated for a *complete* weighing, the weight of the additional material causes the hopper to tilt in the opposite direction and actuates the switch and again starts the entire system. A rather important part of this "variable feed control" is the fact that the machine does not "cut out" in the middle of any weighing—even though the supply runs low before a full weighing has been made—but feeds material until a full weighing has been completed. This is assisted through magnetic control, and suitable wiring. Thus accuracy is insured under any and all conditions of feeding.

A six-figured counter is part of the equipment and this records the number of weighings made by the machine.

The machine is very flexible in that the weighing conveyor—to meet certain local and extraordinary conditions—may be disposed either in line with the feeder conveyor and discharge in the same direction or in the opposite direction; or it can be placed at right angles or at any other angle to the feeder conveyor.

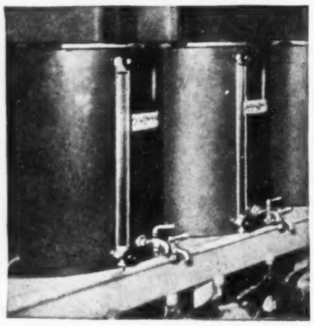
For abrasive or hot materials it is usually equipped with steel apron conveyors. For cool materials, ordinary heavy rubber belting is employed.

Numerous Chemical Applications

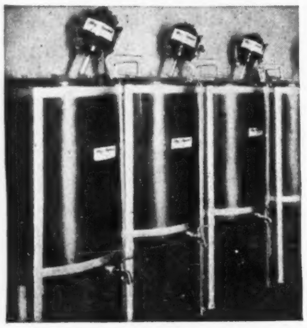
This machine is applicable for a very wide range of materials and is built in a number of sizes to meet every normal requirement. For instance, it is in use on hot carbox mix (a gummy material, very hot and sticky), light soda ash, limestone, phosphate rock, rice flakes (very light), zinc oxide and pigments, barytes, coke breeze, clinkers, gypsum, shale, garbage, coal, bauxite, zinc ores, and many similar materials.

Hy-Speed Hy-Speed Hy-Speed Hy-Speed Hy-Speed Hy-Speed Hy-Speed

ALSOP GLASS-LINED TANKS FOR MIXING OR STORAGE



Air tight Storage Tanks for volatile liquids.



Fully enclosed Mixing Tanks with Hy-Speed Mixers

THOUSANDS are in use processing hundreds of different products, and for storing liquids affected by metallic contact.

SUPERIOR the storage, processing and mixing of liquids in GLASS-LINED TANKS is admitted by all authorities to give superior results.

TANKS the low price of ALSOP GLASS-LINED TANKS is made possible due to specializing in small size tanks only . . . up to 200 gallons capacity. In these sizes, our facilities are unsurpassed.

PORTABLE ELECTRIC MIXERS

Type 6. One of the many models used to mix liquid products in any tank or other container up to 50,000 gallons capacity.

Hy-Speed Portable Electric Mixers with *"PUSH-PULL"* PROPELLERS,

Are the latest improvement in Mixing Equipment. They mix quicker and better than any other method because all the power of the motor is used for mixing, and not wasted through useless out-board bearings or extra gears.

Their cost of operation is lowest. First cost is lowest and the life of the machine is longest.

They clamp to any tank or vat and eliminate labor.

WRITE FOR OUR CATALOGUE

ALSOP ENGINEERING CO

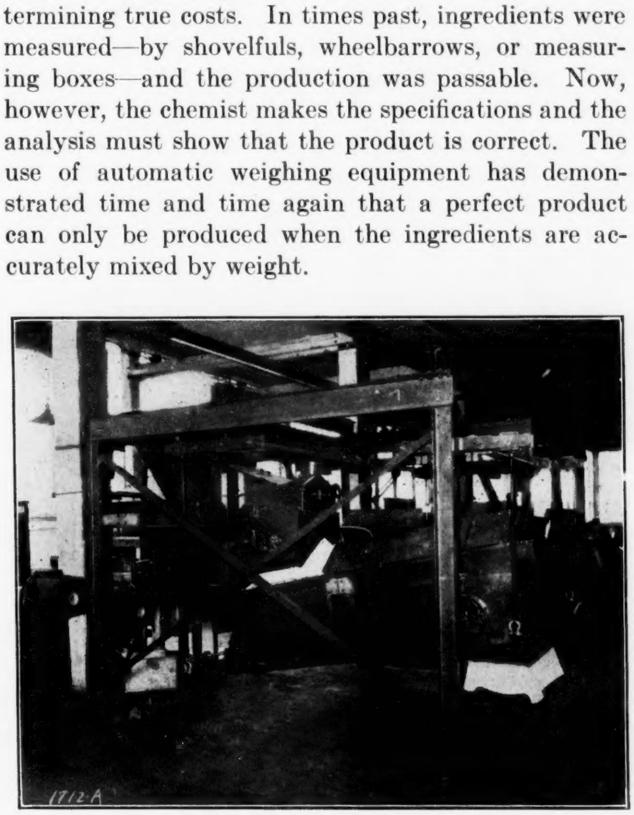
47 West 63rd Street New York City

In one of the largest chemical plants two of these machines are used for proportioning and mixing coal or coke breeze and barytes, these being the ingredients in the production of lithopone. Two more similar sets are being installed for the same purpose in another plant.

One of the most interesting combinations of the system has been its application in the production of zinc. Three machines weigh and proportion the zinc and three are used for varying amounts of coal. Any one or more of the six machines can be cut out of service at will, allowing the remainder to continue in operation. In addition to this, each machine can be set for a varying number of discharges. Thus for instance, should only four machines be in use, one could be set for five discharges, two could be set for three discharges and the other machine for a single discharge. Or the arrangement could be varied considerably, regardless of whether only two or all six machines were in operation. It will be seen, then, that the range of proportioning is very wide and flexible.

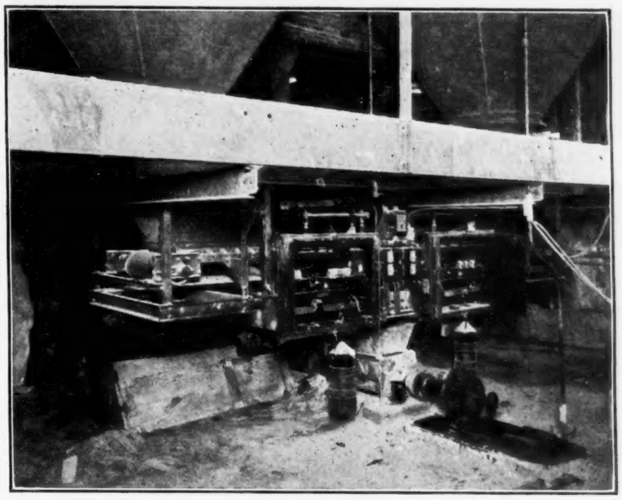
Determining Costs Through Weight Control

As previously indicated, control through weight is recognized as being the most accurate basis for determining true costs. In times past, ingredients were measured—by shovelfuls, wheelbarrows, or measuring boxes—and the production was passable. Now, however, the chemist makes the specifications and the analysis must show that the product is correct. The use of automatic weighing equipment has demonstrated time and time again that a perfect product can only be produced when the ingredients are accurately mixed by weight.



Installation of a "Dustless Convey-o-Weigh", used in weighing light soda ash. Note that the feed and weighing conveyors are both totally enclosed and leak proof.

Another point of control in the larger chemical plants is in the power plant. Engineers spend much time and money studying and testing the meters and charts showing evaporation, temperature of flue gases, amount of boiler feed water used, etc. But oftentimes the amount of coal burned is "approximated" for each boiler. As coal constitutes about 70 per cent of the power cost—and the power cost is sometimes a large item in the cost of producing certain chemicals—it is obvious that this should also be controlled with



Installation of two "Convey-o-Weighs" proportioning and blending coke breeze and barytes. These machines take material from two overhead conicle bottom tanks and deliver mixed ingredients to screw conveyor. Note beam boxes in front.

the same care and given the same thought as other items. It is not enough to know the total amount of coal burned, when six or seven boilers are on the line. The individual consumption of each boiler should be a definite and known fact; and by having such knowledge it will be at once apparent whether each boiler is doing its bit with maximum efficiency, or whether it is operating at a loss because of sooty tubes, holes in fire, improper draft regulation, or what not. Check the cost of power as diligently as you do the raw materials entering into your plant. They all enter into the cost of the finished product and coal is not the least of these.

Weight Aid in Shipping

The last point of control is at the shipping end. Some products can be automatically weighed in bulk or into packages, while others, of course, are shipped in lots of a dozen, hundred, or other unit. In the case of loose materials, automatic scales can be employed accurately to record the weight of the materials as delivered to railroad cars, boxes, barrels or bags. This weighing and conveying system can be used in some instances; in others a different type of automatic scale better serves the purpose.

Link-Belt Co. announces that W. C. Carter, formerly vice-president in charge of production, is now vice-president and general manager of the Chicago plant, succeeding F. B. Caldwell, resigned. E. J. Burnell, formerly manager, Pittsburgh office, is now sales manager, Western division. He has been succeeded by Nels Davis. Company has also appointed several sales agents throughout the East, South and West.

Freight Rate Decisions

Public Service Commission approves new freight rates of the Delaware & Hudson Railroad on binder (lignin liquor), in barrels, carload minimum weight 36,000 pounds, and in tank cars, carload from Ausable Forks and Corinth to Batavia (on Erie) 25c per cwt. Reduction from Ausable Forks 5.5c and from Corinth 3.5c per cwt. Effective October 23, 1929. New freight rates of the New York Central (East) have been approved on potash (caustic) in metal cans, in barrels or boxes or in bulk in barrels, carload minimum weight 36,000 pounds from New York and Brooklyn stations, Long Island City (Pidgeon Street Terminal), New York (including lighterage) and stations Kingsbridge to Port Morris, inclusive to station Depew to Lewiston inclusive 25c per cwt. Reductions. Effective October 18, 1929.

Commission also approves for the New York Central Railroad new reduced freight rates of 25 cents per hundredweight from the class rates on crude epsom salt, carload, minimum weight 40,000 pounds, from New York and Brooklyn stations to various Buffalo, Rochester and Pittsburgh stations.

New reduced rates of 25 cents per hundredweight have also been approved on crude epsom salt in bulk, in bags, or barrels, or in bulk in cars, carload, minimum weight 40,000 pounds, from New York and Brooklyn stations to local stations.

Three new classes of tankcars for shipping explosives and inflammables, were approved at Atlantic City, September 16, by representatives of the American Petroleum Institute and the tankcar division of the American Railway Association, preliminary to submitting the recommendations to the Interstate Commerce Commission safety bureau. The cars approved include a rubber-lined car for sulfuric acid, a high pressure tank for dangerous commodities having vapor pressure characteristics, and a type of car for shipment of chlorine. The cars were tested in a series of demonstrations conducted over a period of one year.

Tionesta Valley Chemical Co., Inc., Olean, N. Y., which operates a wood distillation plant at Mayburg, Pa., files complaint with Interstate Commerce Commission attacking freight rates on carload shipments of crude methanol from Mayburg to Cadosia, N. Y., on ground that actually and relatively lower rates exist from other distillation points in same general territory.

In its study of the effect of transportation costs on fertilizer prices in the spring seasons of 1926, 1927, and 1928, the Bureau of Railway Economics discovered no definite relation between the two. Cash prices paid by farmers varied considerably between consuming points, but none of the divergent price situations were found directly attributable to freight rates.

Combustion Engineering Corp. issues new and revised edition of its general condensed catalog. Copies will be furnished upon request. Company also issues folder entitled "Building a Better Box Header Boiler" which describes the new designs in "C-E" box header boilers and reprint entitled, "Steam Pressures for Industrial Plants Determined by Rational Factors." Copies are available upon request to the company.

Du Pont Cellophane Co. announces transfer of Sterling Thompson from New Jersey to mid-west territory, with headquarters at Chicago. C. W. Bollinger, formerly of the Chicago office, will take over the New Jersey territory.

Durion Co., Inc., issues Bulletin 154, describing construction and operation of No. 806 Durion centrifugal pump.

Dust Recovering & Conveying Co., Cleveland, issues booklet 3A, entitled, "Present Trends in Dust Recovery."

New Plant Construction

Paper Makers Chemical Corp., Kalamazoo, Mich., plans immediate construction of plant on a seven-acre site in the Guilds Lake district, Portland, Ore. Company now operates twenty-two plants in the United States, Canada and England. Plant will consist of several units to cost about $250,000.

Hercules Powder Co. plans construction of experimental plant and research laboratory near Wilmington, to be used in connection with development of company's naval store business. Plant will cost over $150,000 with equipment.

Dry Ice Corp. plans expansion program which includes erection of six new plants in different parts of the country, each to cost over $50,000 with equipment. Program also includes expansion of several existing plants.

Canadian Industries, Ltd., begins construction of new plant at Copper Cliff, Canada, to involve complete expenditure of about $1,500,000. Initial plant is for production of sulfuric acid and nitre cake.

National Pigments & Chemical Co., St. Louis, approves plans for rebuilding of portion of Cadet, Mo., plant destroyed by fire with estimated damage of $75,000.

Tennessee Copper & Chemical Corp. plans construction of one-story addition to Cincinnati plant to cost about $45,000 with equipment.

Farmers Fertilizer Co., Conway, Ark., consolidates with Home Fertilizer Co., Texarkana, and plans erection of $60,000 fertilizer factory in the former city.

Barium Reduction Corp., Charleston, W. Va., plans construction of $500,000 sodium sulfate plant at Horseshoe Lake, Saskatchewan, fifty miles south of Moose Jaw.

California Chemical Corp., Newark, Calif., specialties for ethyl gasoline, begins construction of first plant unit to cost about $50,000.

Oldbury Electrochemical Co., Niagara Falls, begins construction of one-story plant addition to cost about $30,000 including equipment.

Dow Chemical Co. plans addition to plant, consisting of one- and two-story unit to cost about $55,000 with equipment.

Vestal Chemical Co., St. Louis, acquires site for new plant, the initial unit of which is reported to cost more than $50,000.

Davison Chemical Co. purchases 15-acre site in Houston where it plans erection of chemical plant to cost about $1,000,000.

Maas & Waldstein Co., Newark, N. J., lacquers, approves plans for new two-story addition to plant to cost about $45,000.

Du Pont Ammonia Corp. appropriates $3,500,000 for expansion of Belle, W. Va., plant.

Smith-Douglas Corp. begins construction of $75,000 fertilizer plant near Danville, Va.

American Pine Products Corp. plans enlargement of plant at New Augusta, Miss.

U. S. Phosphoric Products Co., Tampa, files plans for initial unit of an acid plant to cost more than $350,000 with equipment.

General Aniline Works, Inc., Rensselaer, N. Y., plans construction of three-story plant unit to cost about $100,000.

Lautaro Nitrate Co. Increases Capital in Expansion Program

Lautaro Nitrate Co., Ltd., plans increase in capital from £8,000,000 to £14,500,000, to allow the board the right to issue $32,000,000 in six per cent debentures to build the new oficina and provide working capital. The increase of £6,500,000 was composed of 2,000,000 ordinary shares of 1s. each, £100,000, and 320,000 seven per cent dollar shares of $100 each, £6,400,000. The latter issue was simply to satisfy the rights granted to the $32,000,000 six per cent debenture holders of converting into the seven per cent dollar shares, which dollar shares would rank *pari passu* with their existing £8,000,000 ordinary sterling shares, which they proposed to convert into seven per cent cumulative preferred shares.

The terms of conversion of the 1,600,000 seven per cent sterling shares of £5 each and the 320,000 seven per cent dollar shares of $100 each were as follows:—The seven per cent sterling shares of £5 each were redeemable at £5 10s. and the seven per cent dollar shares of $100 each were redeemable at $105 (so soon as their legislation allowed), the former by an accumulative sinking fund of £80,000 per annum from the end of the year following that in which the Guggenheim plant came into operation, and the latter by the sinking fund for the redemption of the $32,000,000 debentures which started in 1923.

The 2,000,000 ordinary shares of 1s, each would only be entitled to profits after provision had been made for redemption of all their debenture issues, debenture interest, and preferred share redemption and 7 per cent interest.

Subject to their confirming the resolutions explained above, resolutions came into operation which provided for the distribution on October 15 or soon thereafter of one "no par value share" of the Lautaro Nitrate Corporation of Delaware, U. S. A., for every five shares now held, as a compensation for the modification of the rights of the ordinary sterling shares, and the payment of dividends of 3s. per share payable on October 25 and 3s. per share payable on December 31.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Chemical Markets, published monthly at Pittsfield, Mass., for October 1, 1929, State of New York, County of New York—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Williams Haynes, who, having been duly sworn according to law, deposes and says that he is the Publisher of the Chemical Markets, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Williams Haynes, 25 Spruce St., New York, N. Y.; Editor, none; Managing Editor, Elmer F. Sheets, 25 Spruce St., New York, N. Y.; Business Manager, William F. George, 25 Spruce St., New York, N. Y.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent. or more of the total amount of stock should be given.) Chemical Markets, Inc.; Williams Haynes, 25 Spruce St., N. Y. C.; and W. F. George, 25 Spruce St., N. Y. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company a trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

Williams Haynes, Publisher.

Sworn to and subscribed before me this 19th day of September, 1929. J. Oscar Fischer (My commission expires Notary Public, N. Y. Co. Clerk's No. 474 N. Y. Reg. No. 0-558, March 1930.)

(Seal.)

Citric Acid By Fermentation Attracting Attention in England

Citric acid by the fermentation process is attracting considerable attention in England, especially since the tightening control of the Italian Government of the citrate of lime supplies. Investigations on the subject have been carried on by the Distillers' Co., Ltd., Rowntree & Co., Ltd., and the British Government Laboratory. That a definite move towards working these processes on a commercial scale is under way is apparent from the recent formation of John & E. Sturge, Ltd., which company has entered into agreements with Rowntree & Co., it is thought for the use of the latter's process for fermentation citric acid.

The Rowntree processes (British Patents 266,414 and 266,415) use solutions of sucrose as a raw material and dark-colored *Aspergilli* as the preferred mould, but the process is characterized in that the solutions are not sterilized by heat but by the addition of hydrochloric acid, an essential point being the maintenance of closely controlled hydrogen ion concentration. The latter patent extends the process to invert sugar, glucos, levulose, maltose, glycerine, and other mineral and strong organic acid. The work of the Distillers' Co. is found in the latest specification (British patent 287,604 of 1926) to be characterized by the use as ferments of the enzymes existing in citrus fruits.

In further discussion of the citric acid situation, "The Chemical Trade Journal," London, goes on to say that on the Pacific coast of North America there is already an important citrate-of-lime industry, but the needs of the American home industry are far from met by these supplies, and there is not much hope of American citric acid at cheaper rates than the Italian or German products reaching this country, at any rate in the near future. As a matter of fact, the American output of natural citric acid is supplemented by acid produced by the mould fermentation of sugar. This process is carried out on a large scale, but production figures have never been published, nor have any but the merest outlines of the process been employed. It is known, however, that the method consists essentially in the inoculation with spores of a special strain of *Aspergillus Niger*, of the contents of large shallow pans filled with sterile sucrose solution containing the necessary nutrient salt. In from two to four days a continuous felt of mycelium forms over the entire surface of the solution and citric acid formation begins, and the fermentation has usually run its course by the end of the tenth day after inoculation. The solution is then drained off, the mycelium pressed to remove any acid present in the tissues, and the acid is recovered in yields of approximately 50 per cent by weight of the sugar taken. Many difficulties were encountered in the transference from the laboratory to the plant scale, but the nature of these difficulties and the means employed in solving them have been kept as carefully guarded plant secrets.

World production of oxygen for sale is now 150,000,000 cubic meters of which Germany produces 30,000,000 and consumes 12,000,000, according to estimates by Alexander Wacker Co., Munich. In addition there is another 100,000,000 cubic meters produced in plants where consumed, 35,000,000 cubic meters of which is Germany's share. The hourly capacity of the German plants producing oxygen for sale at the end of 1928 was 3,600 cubic meters. German consumption of acetylene in 1928 was over 1,200,000 cubic meters, and the hourly capacity of the six existing German acetylene works at the close of 1928 reached 310 cubic meters.

Lime nitrogen sales agreement is made by the following Japanese producers: The Electric Industry, The Japan Nitrogen, The Daido Fertilizer, the Mitsubishi Imports Department and the Showa Fertilizer, which will commence manufacturing nitrogen for next year, the annual output being between 20,000 and 25,000 tons. The first price agreed upon for next year's shipment, per unit is 19 sen (converted into ton, 102.60 yen for 20 per cent of N).

Artificial Resin Production In France Reaches 13,000 Tons

France produced more than 13,000 tons of artificial resin last year, about 5,000 tons being used by the electrical trade, whose needs are still steadily growing. This industry was only recently introduced in France, in 1922, with a yearly output of 100 tons. To-day the French output represents only 8 per cent of the world's output, 40 per cent being supplied by the United States, 16 per cent by Great Britain and 25 per cent by Germany. A new development in the artificial resin field is being contemplated in France, owing to the activity of the Societe Huiles, Goudron and Derives. This firm is closely connected with the Mines of Lens and has already absorbed one of its competitors, the Societe Chimique de la Drome, which has been producing about one-third of the total present French output. The Huiles, Goudrons and Derives Co. will take over the Ste. Chimique de la Drome's plant at the Bourg-lez-Valence works in southern France and bring it northward in the Lens mining district, where coal carbonization factories are. The former monthly 100 ton output will be shortly doubled and possibly trebled.

Kaikohe Development Co., Ltd., New Zealand, capitalized at £25,000, subsidiary of Imperial Chemical Industries, is erecting plant at Kaikohe, north of Aukland, N. Z., to vaporize mercury from cinnabar deposits there. Plant includes two rotary furnaces to vaporize the mercury in the ore, and condensers. The ore is in earth and not in solid rock, and does not need crushing.

Japan has five major companies producing 33,000 tons of creosote oil annually. Seventy-five per cent of the total production is consumed in Japan chiefly by lumber treating companies. Some is used by chemical manufacturing companies in treating disinfectants.

Chemical Facts and Figures

Commercial Solvents Corp. Acquires Commercial Pigments

Company Also Increases Capital Stock to 3,000,000 Shares to Permit 10 for 1 Split-up—Two per Cent Stock Dividend Declared—Purchase Price Amounts to About $6,000,000.

Commercial Solvents Corp. acquires Commercial Pigments Corp. through an exchange of shares. Former company also increases capital stock to 3,000,000 shares from 250,000 to permit a split-up on basis of 10 new shares for each share held. An extra stock dividend of two shares for each 100 held is declared, payable October 1 to stock of record September 23.

One share of Commercial Solvents old stock is being offered in exchange for nine shares of Commercial Pigments common stock, so approximately 12,000 shares of Commercial Solvents old stock will be required to make the purchase. Directors of the former corporation have expressed the belief that it will be possible to obtain at least 84,000 shares of the class B Commercial Pigments stock on this basis. At current asking prices for Commercial Solvents stock, this would represent a consideration of more than $6,000,000.

Commercial Pigments Corp. has issued 27,000 shares of class A stock and 58,000 shares of class B and warrants with the class A stock or cash for 54,000 shares of class B stock. In the negotiations with the Commercial Solvents Corp., the outstanding stock of the Commercial Pigments Corp. is assumed to consist solely of 112,000 shares of class B without par value.

Commercial Pigments Corp., whose plant is in Baltimore, is occupied chiefly with the manufacture of titanium oxide under the Blumenfeld process. It also has patents covering the manufacture of titanium lithopone, or titanium white pigment, a composition of titanium oxide and barytes. The corporation also has a substantial interest in the Travancore Minerals Company, a British corporation owning extensive concessions for the mining of ilmenite, an iron-titanium ore from which titanium oxide is produced.

Certain directors and officers of the Commercial Solvents Corp. were largely instrumental in the organization of the Commercial Pigments Corp. in 1927.

Statement of Commercial Solvents Corp. as of June 30, 1929, shows total assets of $11,526,502, comparing with $10,097,171 on December 31, 1928, and earned surplus of $5,128,013 against $4,315,837. Current assets totaled $8,459,272 and current liabilities $1,402,364, comparing with $6,378,499 and $1,317,777, respectively, on December 31, 1928.

American Solvents & Chemical Corp., New York, announces appointment of Roy Clark, previously associated for many years with the Kentucky Alcohol Corp., as Eastern sales manager with headquarters in New York. Charles H. Blomberg, formerly associated with the Rossville Commercial Alcohol Corp. and previously with the Federal Products Corp., is appointed manager, St. Louis division, in charge of Southwestern territory.

National Ammonia Co., subsidiary of E. I. du Pont de Nemours & Co., Inc., acquires Pacific Ammonia & Chemical Co., largest manufacturer of anhydrous ammonia on the West coast. The merged business will be conducted under the name of National Ammonia Co., Inc.

Many Chemical Companies on Senate Tax Information List

Chemical companies are prominent in the list of those taxpayers whose names are forwarded to the Department of the Treasury for certain income tax information which the Senate Committee on Finance decided was necessary for adequate study of the tariff bill. This income tax data does not include the tota of tax paid, but the statements of profits or losses, wages paid workers, salaries paid officers, gross sales and inventories.

The delegation from the chemical industry in this group of some 323 names included: Abbott Laboratories, Archer Daniels Midland Co., General Dyestuff Corp., General Aniline Works, Consolidated Color & Chemical Corp., Bakelite Corp., Arnold Hoffmann & Co., Beaver Chemical Corp., Damascus, Va.; Calco Chemical Co., Carbide & Carbon Chemical Corp.

Colgate & Co., Commercial Solvents, Corp., Corn Products Refining Co., Dye Products & Chemical Co., Eastman Kodak Co. Hooker Electro Chemical Co., Mathieson Alkali Works, Merck & Co., Monsanto Chemical Works.

United States Industrial Chemical Co., Victor Chemical Works, Emery Industries, Inc., Heyden Chemical Corp., Grafield, N. J.; Vanadium Corp., Oldbury Electro Chemical Co.

Allied Chemical & Dye Corporation, American Cyanamid Co., Bakelite Corp., Davison Chemical Co., Dow Chemical Co., E. I. du Pont de Nemours & Co., General Chemical Co., Glidden Co., Grasselli Chemical Co., Inc., Hercules Powder Co.

Koppers Co., Mallinckrodt Chemical Works, National Aniline & Chemical Co., Semet Solvay Co., Sharples Solvents Corp., Solvay Process Co., Union Carbide & Carbon Co., U. S. Industrial Alcohol Co., Westvaco Chemical Co.

Shell Chemical Co. to Construct $5,000,000 Nitrogen-Fixation Plant

Shell Chemical Co., a suit of the Shell Development Co., is constructing a nitrogen-fixation plant on a 400-acre tract of land near Long Beach, Calif. Expenditures of $250,000 within six months in erecting the first unit of the plant is planned. One thousand men will be employed in the first unit and ultimate investment will total $5,000,000. The plant will be the largest of its kind in the West. Nitrogen will be extracted from the air to provide the principal product of the plant. Operations will be under late German patents. Electricity will be used for power in the plant. Reports have it that the Shell project at Long Beach contemplates the utilization of natural gas, of which the nearby oil fields have a great excess, in the manufacture of carbon black, the hydrogen evolved in this process to be used in making ammonia in the nitrogen-fixation plant. The Royal Dutch-Shell interests in Holland recently began the production of synthetic ammonia and nitrogeneous fertilizers at Ijmuiden in conjunction with the Koninkligke Hooqovens.

Union Solvents Corp. locates executive and general offices at 110 East 42 st., New York. Plant is located at Cincinnati where butyl alcohol, acetone and allied products are manufactured. Chemical Solvents, Inc., New York, is sales representative for the company.

Atmospheric Nitrogen Co. transfers general offices from Syracuse, N. Y., to Hopewell, Va.

Monsanto Chemical Co. moves Eastern district sales office to 10 East 40st., New York.

Personal and Personnel

Burt H. Goddin, whose previous connections include the Roessler & Hasslacher Chemical Co., Powers-Weightman-Rosengarten Co., and Hoffmann-La Roche, Inc., is elected vice-president in charge of sales, Euro American Corp., American representative of Metzner & Otto, Leipzig, Germany. The company maintains executive offices and laboratory in Newark, N. J., and sales offices in New York.

Dr. Herbert H. Dow, president, Dow Chemical Co., is announced as recipient of the Perkin medal for 1930. Presentation will be made January 10, 1930, at a meeting at the Chemists' Club, New York. Other speakers on the program include James T. Pardee, E. O. Barstow and William H. Nichols.

Herman A. Metz, president, General Dyestuffs Corp., speaks at luncheon in honor of Mayor Gustav Boess, Berlin, Germany, given by the Board of Trade for German-American Commerce. He urged the defeat of the pending tariff bill.

George A. Benington, formerly vice-president, Bowker Chemical Co., is elected president, succeeding Horace Bowker, who resigned owing to increased duties as president, American Agricultural Chemical Co.

Sir William Alexander, K.B.E., M.P., president, American British Chemical Supplies, Inc., and a director, Celanese Corp., visits this country making his headquarters at the New York office of the company.

Henry Moran, sales manager, chemical department, Ellis Jackson & Co., Philadelphia, serves on Non-Partisan Citizens Campaign Committee in that city in behalf of candidacy for re-election of Magistrate Louis Hamberg.

Sir Harry McGowan, Lord Birkenhead, Henry Mond, and Col. G. P. Pollitt, all of Imperial Chemical Industries, Ltd., visit this country to "discuss with their American associates certain important matters.

W. Astles, manager, chemical department, Cookson Produce & Chemical Co., London, Eng., visits office of New York representative, Renouf & Co., Inc. He is in this country to secure the European representation for American chemical products.

J. Wrench, sales manager, Industrial Chemical Sales Co., New York, returns from business trip to the Pacific Coast made in connection with the expansion of the company's business in that territory.

William Maguire, Jr., formerly superintendent of production is appointed manager, Chemical & Pigment Co., Inc., Oakland, Calif., succeeding Donald S. Gremfell.

W. H. Zillessen is appointed manager, Boston office, Newport Chemical Works, succeeding W. A. Keating, who asked to be relieved due to ill health.

Wayne H. Carter resigns as chief chemist, Sharples Solvents Corp. to become associated with Carrier Engineering Corp., Newark, N. J., in its new technical department.

Dr. B. R. Rhees, formerly narcotic agent in charge of the Washington division, is named Deputy Commissioner of Prohibition in charge of narcotics enforcement.

Lord Melchett is chairman, Palestine Emergency Committee, formed to relieve destitution in Palestine.

Frederick Mueller joins Baltimore sales force of Bradley & Baker, New York chemical dealers.

Horace Bowker Elected President, American Agricultural Chemical

Horace Bowker, vice-president, American Agricultural Chemical Co. since 1920, is elected president of the company succeeding George B. Burton, who together with Robert S. Bradley, chairman of the board declined to accept re-election.

Horace Bowker was born in Boston, May 13, 1877 and was educated at Harvard University. His first business connection was as assistant superintendent and superintendent, C. O. Bowker Fertilizer Co., 1899-1902. In 1903 he became sales manager, Baugh & Sons Co., Philadelphia. He became associated with the American Agricultural Chemical Co. in 1908 as secretary of the company. During the war, he was president, Chemical Alliance, Inc., and is an active member of the National Fertilizer Association and of the Harvard Club.

Personal reasons were said to have motivated George B. Burton and Robert S. Bradley in their resignations. Both of them have been connected with the fertilizer business for many years. They will continue to serve the company as members of the board. No successor was named to the position vacated by Mr. Bradley.

Letter from directors to stockholders announcing the change, says, in part: "Mr. Bradley has been identified with the company for over 50 years and Mr. Burton for over 42 years. The terms of their executive office in the last few years included a period of radical readjustment for the company which brought receivership and losses to other companies in the industry. Mr. Bradley and Mr. Burton carried the company successfully through these dangers.

"Funded debt of company has been reduced to $9,541,500 as of June 30, 1929, compared with $36,616,000 in 1921, and company has over $6,000,000 cash and no bank loans."

Robert Collyer Ingalls

Robert Collyer Ingalls, president, Doe & Ingalls, Inc., Boston, dies unexpectedly at his home in Lynn, Mass., September 11, aged 56. He was born in Lynn, August 18, 1873, and began his business career with the Commonwealth Manufacturing Co., later the American Methyl Co., in 1898. In 1907 he became associated with Howe & French, Inc., remaining with them until 1921, when the firm of Doe & Ingalls was established.

Thomas J. Dee, vice-president and secretary, Davison Chemical Co., dies unexpectedly while on a visit to New York, August 29, aged 41. He was born in Yonkers, N. Y., in 1888, educated at New York University, being graduated from the law school, and moved to Baltimore sixteen years ago, when he became connected with the Davison company.

Dr. W. H. Perkin, son of the late Sir William Perkin, discoverer of coal tar dyes, and professor of chemistry in Oxford University, dies in London, September 17, aged 59.

George B. Phillips, for many years president, Phillips & Jacobs, manufacturing chemists, Philadelphia, dies September 25, aged 88.

F. M. Biffen, for ten years with British Government Laboratories, takes position with Foster Dee Snell, consulting chemist.

News of the Companies

Air Reduction Co., American Cyanamid Co., Buffalo Electrochemical Co., Buffalo Foundry & Machinery Co., Dry Ice Corp., Du Pont Rayon Co., Du Pont Cellophane Co., Hooker Electrochemical Co., Larkin Co., Lucidol Corp., Mathieson Alkali Works, National Aniline & Chemical Co., National Carbon Co., Niacet Chemical Co., Oldbury Electrochemical Co., Philadelphia Quartz Co., Roessler & Hasslacher Chemical Co., Spencer Kellogg & Sons, Union Carbide & Carbon Co., and the Vanadium Corp. are among the participants in the exhibit of chemical industries of the Niagara frontier which opens October 12 at the Buffalo Museum of Science, Buffalo. Exhibit is staged by the Buffalo Society of Natural Sciences in collaboration with the Western New York sections, American Chemical Society and American Electrochemical Society.

E. I. du Pont de Nemours & Co., Inc., announces appointment of John W. McCoy, formerly assistant general manager, explosives department, as general manager. Vice-president J. Thompson Brown, has been elected a member of the company's executive committee. Edward B. Yancey, formerly manager, Birmingham plant, is appointed assistant general manager of the department.

General Naval Stores Co. moves research laboratory from Cincinnati to Passaic, N. J., on the premises of Newport Chemical Works. E. V. Romaine, technical director, and H. J. Warmuth, chemist, continue in charge of research work.

Jaenecke-Ault Co., ink manufacturer, is reorganized and business sold to group called Jaenecke-Ault Corp., headed by Frederick G. Muz, former official of old company. Reported purchase price was $75,000.

Texas Gulf Sulphur Co. acquires sulfur rights to mines at Long Point, Tex., from Gulf Production Co. This is the company's third mine as production is now going on at Gulf and Boling.

Hooker Electrochemical Co. publishes an attractively bound and illustrated 78-page catalog of its products. The book at the same time serves as a manual of information for those interested in any of the company's products.

Wishnick-Tumpeer, Inc., develops the manufacture of carbon black through the Wheatley Press process. Product is marketed under trade name of "Disperso" carbon black.

United Chemicals, Inc., acquires Barium Products, Ltd., Modesto, Cal., sodium sulfide producer, and Peroxide Manufacturing Co., San Francisco, hydrogen peroxide manufacturer.

Du Pont Viscoloid Co. announces that Leonard Bertoli, formerly sales manager, Fuller-Morrison Drug Co., Chicago, if appointed assistant sales director.

Industrial Alcohol Institute completes motion picture film illustrating the production of industrial alcohol. Film is available for distribution in 35 and 16mm. sizes.

Philipp Bros., Inc., New York, announces removal of Boston office to 176 Federal st.

Newport Chemical Works, Inc., announces new vat yellow, "Anthrene Yellow RC paste."

Eastern Potash Co.'s old plant at Raritan, N. J., is sold in bankrupt sale at $10,000.

Pacific Chemical Co., Los Angeles, moves into its new factory in that city recently completed at cost of $125,000.

James A. Rafferty Elected President of Carbide and Carbon Chemicals

James A. Rafferty, vice-president, Carbide & Carbon Chemicals Corp., since 1924, is elected president of the company, succeeding William F. Barrett, who is now chairman of the board. James A. Rafferty was born in Chicago and graduated by the Lewis Institute of Technology as a mechanical engineer in 1908, when he became associated with the People's Gas Light & Coke Co. He was assistant general superintendent of plants for the Linde company when he first became connected with Carbide & Carbon Chemicals Co. in 1917.

In addition to the presidency of the latter company, he is an officer of several affiliated companies, being vice-president, Linde Air Products Corp.; the Presto-lite Company, and the Union Carbide & Carbon Research Laboratories; president, Clendenin Gasoline Co., Charleston, W. Va.; and secretary, Niacet Chemical Corp. He is a member of a number of scientific and technical societies and of the Westchester Country Club.

Grasselli Chemical Co. Holds Eastern Sales Conference

Grasselli Chemical Co. holds Eastern division sales conference in New York office, September 20. The occasion was especially significant in that it marked the first divisional conference since the Du Pont-Grasselli merger. The meeting was presided over by W. C. Mills and addressed by the following: H. P. John, E. A. Orem, J. Krackeler, J. H. Kennedy, P. Gieberich, and H. Ziesing. The speakers all dealt with the problems of the company's sales organization.

On September 21, the annual sales outing was held at Forked River, N. J., special trains taking the entire party to headquarters at Eno's Riverside Hotel, and returning it to New York on the following day after a week-end of golfing and fishing.

Clayton French

Clayton French, a director, Smith, Kline & French Laboratories, Philadelphia, and son of the late Harry B. French, founder of the house formerly known as Smith, Kline & French Co., dies in New York, September 3, aged 45. He joined his father's company in 1906 following his graduation from Harvard University, and subsequently was an executive in the succeeding company called Smith, Kline & French Laboratories. He was a veteran of the World War, being discharged with the rank of captain, and was interested in sports, being active in the Merion Cricket Club and the Radnor Hunt and Racquet Club.

Mellon Institute of Industrial Research is conducting an investigation of bricks involving the rate of absorption and total absorption of moisture by brick; the surface characters of brick; the merits of different cementing materials, ranging from pure lime to pure cement, and of various sands and mortar pigments; the effect of varying the type of backing, both as to material and size of unit; the results of variation in workmanship, including pointing, tapping, and the filling of head-joints; the effect of variation in design, involving a study of coping and parapet construction, of capillary contact of condensation, and of elasticity; and the behavior of mortar with reference to the other variables in all types of climatic conditions.

Franklin P. Summers Becomes Associated With Calco Chemical

Franklin P. Summers, who had been general manager, Noil Chemical & Color Works, New York, since 1918, resigns to become associated with the Calco Chemical Co. He has been in the chemical business since his graduation from Harvard University in 1906. Until 1908 he was with the Organic Chemical Co., Philadelphia. He left there to become director of the analytical and research laboratories of Abbott Laboratories, Chicago, which position he held until 1915, when he became connected with the Federal Dyestuff Corp., Kingsport, Tenn., first as operating superintendent, then as chemical engineer, and finally as president and general manager. Since 1918 he had been general manager of the Noil company.

He is a member of the Synthetic Organic Chemical Manufacturers Association and of the Salesmen's Association, and has held offices in both of these organizations. He is also a member of the American Institute of Chemical Engineers, American Association of Textile Chemists & Colorists, the Chemists' Club, and the Drysalters Club.

American Chemical Industry Ranks Third in Capitalization

The American chemical industry is now third in capitalization among American industries, third in number of employees, first in consumption of coal, and second in consumption of electrical energy. The total value of the output of chemicals has increased from $1,046,994,000 in 1914, to roughly $3,000,000,000 in 1928, the latter figure representing more than half the total value of the world output. Of the production, about 6 per cent ($200,000,000) is exported, so that 94 per cent of the industry is kept occupied in supplying the home market. As the number of establishments in the industry has fallen from 9848 in 1914 to 7597 in 1925, it is evident that rationalization is making progress, according to the New York Trust Co.

Roughly 80 per cent of the world's chemical trade is in the hands of the United States, Germany, the United Kingdom, and France, the total exports in 1928 representing a value of $800, 000,000, of which Germany supplied 40 per cent and the United States 25 per cent.

Achema VI, exposition of the chemical apparatus industry of Germany, will be held at Frankfort-on-Main, June 10-22, 1930, at which time the annual convention of the Association of German Representatives of the Chemical Industry will be in session. Manufacturers and others desiring to exhibit may communicate with the American representative of Achema VI, the International Exposition Co., Grand Central Palace, New York.

Formation of Ansbacher-Siegle Corp. is approved by stockholders of G. Siegle Corp. and Ansbacher Corp. Board of directors of new organization consists of following members: chairman, B. R. Armour, George L. Armour, Albert E. Waller, S. S. Thiel, F. W. Wekman, Arthur Wass, Julius Culmann, E. L. McBridge and George F. Lewis.

Chemists' Club, New York, awards national scholarships to two students at Bucknell University for exceptional work in chemistry and industrial engineering. They are Francis D. Meeker, winner of the Hoffman scholarship, and Kenneth B. Andrus, winner of the Bloed scholarship.

Union & Levers, a new holding company, is organized in England to consolidate the interests of Lever Bros. and the Margarine Union. The two companies control about all of Great Britain's soap business.

Ampthill plant, Du Pont Rayon Co. plans to reach full operating capacity about October 20 at which time production will be at the rate of 4,000,000 pounds annually.

Du Pont Names E. G. Robinson to Head Dyestuffs Department

Edmund G. Robinson, assistant general manager, dyestuffs department, E. I. du Pont Nemours & Co., Inc., since 1925, is named general manager of the department succeeding W. F. Harrington who was recently. elected a member of the executive committee of the corporation.

Edmund G. Robinson became associated with the Du Pont company in 1905, upon his graduation from Swarthmore College. He was director of the Delta laboratory, chemical superintendent of the Old Hickory smokeless powder plant at Nashville, assistant director of the service department, and finally assistant general manager, dyestuffs department.

Cesare Protto who succeeds him in this latter position has been with the company since 1917, first in the development department and later in the dyestuffs department, where he was successively manager, technical division; assistant director and director of sales.

Imperial Chemical Industries and I. G. Face Patent Battle

Very important and probably prolonged patent action between Imperial Chemical Industries and the German I. G. respecting certain dyestuffs, is reported brewing in England. The I. C. I. is asking for the revocation of three patents held by the I. G., and the I. G. is applying for power to amend these patents. It is understood that the action has reference to certain dyestuffs of the azoic or naphthol AS class. The original patents, taken out by the I. G. as long ago as 1912, have now expired, but certain selection patents taken out by the I. G. are still in operation and these, it is contended, give the I. G. a virtual monopoly, although their original patents have expired. It is these selection patents that the I. C. I. is understood to be challenging. The case, which it is expected will come up shortly, will be followed with great interest, says "Industrial & Engineering Chemistry."

Professor Bradley Stoughton, head of department of metallurgy, Lehigh University, is awarded Grasselli medal for 1929 for his paper on "Light Structural Alloys." Presentation will be made at a meeting of the American section, Society of Chemical Industry, at the Chemists' Club, New York, November 8, at which time he will read a paper on "Materials for Airplane Construction."

Chemical section, National Safety Congress, is addressed by following speakers, during the course of the eighteenth annual meeting at Chicago, September 30 to October 4: F. C. Whittemore, Harrison E. Howe, David I. Macht, Stephen E. Whiting, A. L. Armstrong, George H. Miller, Henry H. Marsh, F. J. O'Connor, and E. Minshull.

Virgil G. Thomas, formerly engaged in the dry color business under his own name, takes charge of newly established dry color department of Hammill & Gillespie, Inc., New York. His previous connections also include those with L. H. Butcher Co. and Wishnick-Tumpeer, Inc.

Thomas J. Shields, New York, Eastern representative, James B. Day & Co., Chicago, for sale of "Nu-Pros" glaze, announces that local stocks of the glaze, both brown and white, will be carried in the New York warehouse.

Salesmen's Association Golfers Undaunted by Wind and Rainstorm

About thirty web-footed and water-proofed chemical salesmen brave the rigors of a driving rainstorm in the annual Fall golf tournament of the Salesmen's Association, American Chemical Industry, at the Lenox Hills Country Club, Farmingdale, L. I., October 1. Thirteen took prizes while the remainder only took colds.

Grasselli Chemical Co. had the unusual honor of having its representatives take prizes for both the best and the worst golf displayed in the downpour. J. M. Alvarez of that company won low gross with an 86, while E. J. Maguire, his co-worker, won the honest golfer's prize, turning in a card of 169. (It *was* an 18-hole course). Second low gross went to Grant A. Dorland, of the MacNair-Dorland Co., with a 94, while Vic Williams, Monsanto Chemical Co., took third place with a 98.

Low net winners were divided into two classes depending upon how badly they had fooled the handicapped committee. Prizes in Class A were won by B. Ullrich, Passaic Color Co., 74; A. J. Higgins, Zinsser & Co., 75; and R. J. Grant, Noil Chemical Co., 78. Class B prizes were won by W. Adkins, Givaudan-Delawanna, Inc., 66; Wayne Dorland, MacNair-Dorland Co., 76; and C. O. Lind, Dow Chemical Co., 79. Prizes in the kickers' tournament were won by E. F. Sheets, Chemical Markets; H. B. Shattuck, Abbott Laboratories; and S. Urban, E. R. Squibb & Sons; in the order named.

Imports of Synthetic Dyes Increase During August

Synthetic dye imports registered a further increase during August, according to the United States Tariff Commission and the Department of Commerce. Arrivals for the month totaled 511,038 pounds, as compared with 501,240 pounds in July and with 389,957 pounds imported during August last year. The invoice value of the August imports amounted to $438,363, as compared with $424,314 in July and with $317,879 in the same month last year.

Total imports for the first eight months of the year were brought to 4,279,756 pounds, with an invoice value of $3,490,235, as compared with 3,514,034 pounds, valued at $2,798,138, in the corresponding period last year.

New Incorporations

Synthetic Nitrogen Products Corp.—A. C. Vandiver, Manhattan—500,000

Warwick Soap and Chemical Co.—Stone & Perlman, 2 Lafayette St. Man.—200 sh com.

Sanitol Chemical Products Corp.—L. Busell, 11 W. 42nd St.—100 shs com.

Ansbacher-Siegle Corp. (formed by consolidated of Ansbacher Corp. and G. Siegle Corp. of America)—Tibbets, Lewis & Rand, 15 Broad St.—80,000 shs com.

Thornfield Chemical Co. of Delaware, New York, N. Y. patents—U. S. Corp. Co.—2,000 shs com.

Art Importing Co. dyes, chemicals—L. A. Kent, 370 E. 149th St.—15,000.

E. M. Hawkins, Ltd., Hamilton, Ont., chemicals—$40,000—Harry E. Hawkins, Elgin M. Hawkins, Donald T. McDonald.

Chemo Cleansers, chemicals—M. Permut, 302 Broadway—10,000.

Buffalo Colloidal Phosphate Sales Co., Buffalo, chemicals—Falk, Phillips, Twelvetrees & Falk, Buffalo—400 shs com.

Helena Beauty Shops—W. Feinberg, 1440 Broadway—$3,000 pf.—100 shs com.

Matawan Drug Co., Matawan, Geran, Matlack & Lautman, Asbury Park—300 shs com.

Astoria Enamel and Chemical Co.—W. C. McKee, 215 Montague St., Brooklyn, N. Y.—$10,000 pf., 200 shs com.

Oxine Chemical Corp., Wilmington, Del., druggists, chemists—Corp. Trust Co. of America—150,000 shs com.

Mixall, Inc., Bellevue, N. J., Lacquer, enamel products—Registrar and Transfer Co.—$600,000 and 25,000 shs com.

Pure Carbonic, Inc., Wilmington, Del. carbonic acid gases—Corp. Trust Co. of America—5,000.

Biddle Laboratories, Inc., Trenton, manufacture alkalies—Erwin E. Marshall, Trenton—50,000.

Leland I. Doan Appointed Sales Manager for Dow

Leland I. Doan, for the past ten years assistant sales manager, Dow Chemical Co., is appointed sales manager, succeeding G. Lee Camp, who has been obliged to lighten his duties because of ill health. The latter, who has been associated with the Dow Chemical Co. for twenty-eight years, the last half of which he has been sales manager, will remain with the company in a consulting capacity.

Leland I. Dean has been connected with the sales department of Dow Chemical Co. since 1917. He was born in North Bend, Neb., November 9, 1894, and was educated there and at the University of Michigan. He is a Mason and a Shriner, and a member of Sigma Chi and the Saginaw and Midland Country Clubs.

Czechs Plan Opposition to Inroads of I. G. Farbenindustrie

Efforts of the I. G. Farbenindustrie of Germany to establish a market for its products in Czechoslovakia by transfer of part of its production to that country and by price concessions have aroused opposition directed toward protecting and preserving the Czechoslovak chemical industry. Negotiations are said to be under way between the Czechoslovak Government and the Aussig Chemical Association for the participation of the former in the enterprise. Transfer of the general management from Carlsbad to Aussig and establishment of submanagement possibly to deal with Government relations at Prague are under consideration, according to the Department of Commerce.

Important sodium sulfate development is said to be planned for south central Saskatchewan near Ormiston or about 60 miles, south of Moose Jaw. An American chemical corporation has secured six sections of land estimated to contain at least 9,000,000 tons of sodium sulphate and expects to be in production early in 1930. The International Nickel Co., Sudbury, Ontario, is expected to take a large part of the output for use as a flux in smelting nickel and other ores, reports assistant Trade Commissioner C. E. Brookhart, Winnipeg.

Cyanamid, a fertilizer rich in nitrogen, widely used in Europe, can be successfully employed by farmers of the United States if proper attention is given to mixing it with the soil. Only a small amount of unmixed cyanamid is used in America, according to the Department of Agriculture, as farmers of this country are impatient of delay, and want quick results, whereas the European grower is satisfied to take more time and to employ more painstaking hand labor.

Du Pont Viscoloid Co. announces appointment of W. D. Ward, district manager, San Francisco, as director of sales, succeeding J. F. O'Shaughnessy, resigned.

Imperial Chemical Industries plans expansion into South American markets. Program includes erection of plant at Buenos Aires and formation of Argentine subsidiary.

Alabama By-Products Corp., Birmingham, ships about half of its monthly output of 210,000 gallons of benzol to Germany, France and England.

Linde Air Products Co., New York, announces opening of new oxygen plant at Erie, Pa., with J. J. McKeen as superintendent.

The Financial Markets

Union Carbide Offers Rights to New Stock in Ratio of 1 to 12½

New Financing Provides About $53,000,000 in New Money for Expansion Program—American Cyanamid Offers New Stock—Dow Splits Five for One.

Offering by Union Carbide & Carbon Corp. of rights to stockholders to subscribe to one share of new stock at $80 for every 12½ shares held provides approximately $53,000,000 in new money for the company's expansion program. At present there are 8,306,108 shares of capital stock outstanding, which will be increased by 664,488 shares, making the total outstanding 8,970,596 shares, without allowing for any additional stock that may have been issued since June 30.

This is probably the biggest single piece of financing that has been done so far by any company in the chemical field, says the "Wall St. Journal," in which Carbide is becoming a leader through its subsidiary, Carbide & Carbon Chemicals Corp. The growth of this company in West Virginia, together with expansion along chemical and electro-metallurgical lines at Carbide's Niagara Falls plant, constitutes one of the most important developments in the country to-day, both in the amount of money involved and in its ultimate effects on industry.

Union Carbide & Carbon's plant account at the close of 1928 totaled $198,198,901 against which are set up depreciation reserves amounting to $44,363,008, making not plant account $153,835,893. The importance of the present financing is thus obvious since it will add 33⅓% to the company's plant account and ultimately should have a corresponding effect on earnings.

While no official statement has been made regarding the use which will be made of the new funds it is probable that a substantial part will be spent on the extensive and costly development now under way in West Virginia. At Glen Ferris, where the company owns a large amount of water power, a new plant is being built which will require in the neighborhood of $20,000,000 to $30,000,000. This will supply electric power to a new electro-metallurgical plant in the same neighborhood and also to the plant at Charleston, W. Va., where a range of important new chemicals is being made from the chlor-hydrin base utilizing natural gas as well as by other methods.

American Cyanamid Offers New Stock for Expansion Program

American Cyanamid Co. offers stockholders the right to subscribe to one share of Class B common stock for each two shares of Class A or Class B common now held at $30 a share. It is expected that the usual quarterly dividend of 40 cents a share will continue to be paid on all shares issued. This offering of stock will be underwritten by Guaranty Co., who have associated with them Lehman Bros. and Spencer Trask & Co. New funds will be used for additions and improvements to plants, including those of recently acquired companies, and to increase working capital. Rights accrue to stockholders of record October 8.

Dow Chemical Co. approves increase in authorized common stock to 1,000,000 no-par shares from 200,000 shares and issuance of four additional shares for each share held. This is equivalent to a five-for-one split-up of the present stock.

Mathieson Alkali Additional Stock Offered at $40 Share

Mathieson Alkali Works votes to offer stockholders additional common shares at $40 each on a basis of one share for each ten shares held on Sept. 7. The offer expires Sept. 27. The proceeds are to be used over the next four years for plant expansion and provisions for the manufacture of new products.

Following a 300 per cent stock dividend last April, and an increase in the number of authorized shares from 200,000 to 1,000,000, the company had outstanding 576,228 common shares. This number was increased by a dividend declared in May which was optional in payment in cash or stock, so that the company estimates that it will be necessary to issue about 59,000 additional shares to meet the requirements of the present offer. This would bring into the treasury approximately $2,360,000.

Statement of Mathieson Alkali Works as of June 30, 1929, shows total assets of $18,625,360 compared with $17,922,643 on December 31, 1928, and total surplus $7,129,247 against $6,997,005. Current assets totaled $3,827,847 and current liabilities $1,012,976 as contrasted with $3,592,186 and $1,012,129, respectively, on December 31, 1928.

Davison Chemical Co. Reports Net Profit of $1,643,434 for Year

Report of Davison Chemical Co. and subsidiaries for year ended June 30, 1929, shows net profit of $1,643,434, after expenses, charges and reserves for depreciation, etc., but before federal taxes. This compares with profit of $2,930,062 including $1,914,069 received from purchasers of 80,000 shares of Silicia Gel Corp. stock, in preceding year. Stock outstanding amounted to 492,000 no-par shares.

Consolidated balance sheet as of June 30, 1929, shows total assets of $41,188,290, comparing with $29,451,657 on June 30, 1928 and combined capital surplus and profit and loss surplus of $10,645,462, against $9,459,696. Current assets were $10,270,496 and current liabilities $2,610,296, as compared with $5,893,092 and $1,270,445 respectively at end of preceding fiscal year.

I. A. C. Net Below Last Year

Report of International Agricultural Corp. and affiliated companies for year ended June 30, 1929, shows net profit of $1,116,617 after interest, depreciation, depletion, etc., equivalent to $11.16 a share on 100,000 shares of 7% prior preference stock, on which there is an accumulation of unpaid dividends. Allowing only for regular annual dividend requirements on prior preference stock, balance is equal to 92 cents a share on 450,000 no-par shares of common stock. This compares with net profit of $1,446,605, including $143,924 award by United States Mixed Claims Commission, equal to $14.46 a share on prior preference and $1.66 a share on common stock in previous year.

Statement of U. S. Industrial Alcohol Co. as of June 30, 1929, shows total assets of $43,331,318, comparing with $40,514,024 on December 31, 1928, and surplus of $15,446,221 against $14,214,214. Current assets on June 30 amounted to $16,326,703 and current liabilities $3,515,970, comparing with $13,727,654 and $2,391,198, respectively, at end of 1928.

United Molasses Co. declares interim dividend on common stock of 10 per cent less tax on new capitalization of £6,000,000, compared with 8 per cent paid on capital of £3,000,000 at this time last year.

Pennsylvania Salt Nets $9.97 as Compared with $8.27 in 1928

Pennsylvania Salt Manufacturing Co. for year ended June 30, 1929, reports net income of $1,495,939 after a depreciation, depletion, development and research reserve and federal taxes, equivalent to $9.97 a share (par $50) on 150,000 shares of stock. This compares with $1,240,453 or $8.27 a share in preceding year when no reserve was set up for development and research.

President's statement says that "in our last annual report, the creation of the Tacoma Electrochemical Co. (whose entire stock is owned by the Pennsylvania Salt Manufacturing Co.) and the erection of a liquid chlorine plant at Tacoma, Washington, were described. A factory, which we believe represents the last word in design and mechanical equipment, is now completed. Owing to the difficulty of securing sufficient tonnage in a highly competitive market, this plant has stood idle for several months, but on June 13 it was started on a small production basis. While it may be some time before this unit is showing satisfactory earnings we believe, in the long run, our location on the Pacific Coast will prove a valuable asset." Company also owns General Laboratories, Inc., Madison, Wisc., manufacturer of disinfectants, and is constructing new sulfuric and unit at Natrona plant.

Pennsylvania Salt Mfg. Co. declares an extra dividend of $1 and the regular quarterly dividend of $1.25, both payable October 15 to stock of record September 30.

Chemical Stocks Show Decreased Value of $426,276,601 in September

A group of nine chemical stocks shows an average net change in points of–4.611 and a decrease in value of $426,276,601 in September as compared with August, according to a recapitulation in the *New York Times*. The following table shows the market activity of these nine stocks during the month of September, with shares listed, closing prices August and September, net change, increases and decreases:

	Sept. 30, 1920 Shares Listed	*—Closing— Aug., 1929*	*Sept., 1929*	*Net Ch'ge.*	*Increase*	*Decrease*
Allied Chemical & Dye	2,178,109	350	315	—35	....	$76,233,815
Commercial Solvents Corp......	226,517	495½	620	+24½	$5,549,667	....
Davison Chemical Company.......	504,072	47½	52	+ 4½	2,268,324	....
Du Pont de Nemours & Company....	10,322,481	213	188½	—24½	....	252,900,785
Mathieson Alkali Works	585,331	60⅞	65⅝	+ 4¾	2,780,322	....
Texas Gulf Sulfur..	2,540,000	72⅜	67½	— 4⅞	....	12,382,500
Union Carbide & Carbon.........	8,565,234	134	122⅞	—11⅛	....	95,288,228
U. S. Industrial Alcohol.........	371,000	208¼	210	+ 1¾	649,250	....
Virginia-Carolina Chemical.......	479,224	11¾	10¼	— 1½	....	718,836
Total.........					$11,247,563	$437,524,164

Freeport Texas Co. reports for quarter ended August 31, 1929, net profit of $869,357 after expenses and reserves for depreciation and taxes, equivalent to $1.19 a share on 729,844 no-par shares of stock. This compares with $1,136,482 or $1.55 a share in preceding quarter and $680,962 or 93 cents a share in third quarter of previous fiscal year.

Net income for nine months ended August 31, 1929, totaled $2,742,876 after above charges, equal to $3.76 a share, against $1,952,393 or $2.67 a share in same period of preceding year.

Freeport Texas Co. declared regular quarterly dividend of $1, payable November 1 to stock of record October 15.

Clorox Chemical Co. declares quarterly dividends of 50 cents each on Class A and B stock, placing them on $2 annual basis, against $1.50 previously. Dividends are payable October 1 to stock of record September 20. Directors also adopted resolution calling special meeting of stockholders to increase authorized capital stock to provide for contemplated stock dividend.

American Cyanamid Co. Reports Net Profit of $2,328,928 for Year

Report of American Cyanamid Co. and subsidiaries for year ended June 30, 1929, shows net profit of $2,328,928 after depreciation, depletion, interest, federal taxes, etc., equivalent after 6% preferred dividends, to $3.12 a share earned on 661,025 average number of combined Class A and Class B no-par common stocks outstanding during the period. Based on the 1,325,462 combined common shares outstanding at end of the period, net profit is equal to $1.56 a share. This compares with $1,547,590 or $3.57 a share (par $20) on 329,510 combined Class A and Class B stocks outstanding at end of previous fiscal year.

Surplus account follows: Surplus on June 30, 1928, $2,326,874; add: Net profit for year ended June 30, 1929, after dividends $925,192; paid in surplus representing excess value of assets of various businesses and properties purchased for capital stock $4,847,200; total surplus $8,099,266; deduct: Write-down in value of patents, processes, etc., acquired during the year $2,305,719; unamortized bond discount and financing expenses written off as at June 30, 1929, $772,839; experimental plants and projects written off $253,100; miscellaneous adjustments written off $282,777; leaving surplus on June 30, 1929, $4,484,831.

During the past fiscal year American Cyanamid Co. expended $13,524,941 for plant improvements and extensions. In addition, by the issuance of stock, the company acquired the assets and business of Calco Chemical Co., Crown Chemical Corp., May Chemical Works, Inc. and a portion of the assets of Beechville White Lime Co. Since the close of the fiscal year American Cyanamid Co. has acquired Selden Co., and Kalbfleisch Corp. The company and its subsidiaries are now producing more than 150 chemical products in plants at 20 separate locations.

American Agricultural Chemical Reports Lower Net for Year

American Agricultural Chemical Co. reports for year ended June 30, 1929, a net profit of $703,778 after expenses, depreciation and depletion, equal to $2.47 a share on 284,552 shares of 6 per cent preferred stock on which no dividend has been paid since April, 1921. This compares with a net profit of $2,237,650 or $7.86 a preferred share and $1.59 a share on 331,221 shares of common stock in the preceding fiscal year after allowing for only regular preferred dividend requirements. Net profit for 1928 does not include $1,029,963 realized from the sale of the Charlotte Harbor & Northern Railway Company, which was 'credited to reserve for contingencies and Federal taxes.

American Commercial Alcohol Assets Up

Statement of American Commercial Alcohol Corp. as of June 30, 1929, shows total assets of $10,795,802 comparing with $8,916,087 on December 31, 1928, and earned surplus of $570,264 against $592,795. Current assets were $4,275,943, and current liabilities $1,771,439 as compared with $3,349,304 and $984,167 respectively, at end of 1928.

Hercules Powder Co. declares regular quarterly dividend of 75 cents on common, payable September 25 to stock of record September 14.

International Printing Ink Corp. declares the regular quarterly dividends of 62½ cents on the common and $1.50 on the preferred both payable November 1 to stock of record October 14.

Ruhr Chemical Corp. retires on October 1, 1929, $106,000 of its outstanding 6% sinking fund mortgage bonds, Series A, due April 1, 1948, at 100.

Merrimac Chemical Co. declares regular quarterly dividend of $1.25, payable September 30 to stock of record September 14.

The Industry's Stocks

1929 Sept. 30 High	1929 Sept. 30 Low	1929 High	1929 Low	1928 High	1928 Low	Sales In Sept.	Sales Since Jan. 1	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1928	Earnings $-per share-$ 1927
								NEW YORK STOCK EXCHANGE					
204	201½	218⅞	95⅛	99⅜	59	102,400	817,100	Air Reduction	No	683,873	$2.00	4.60	10.74
318¼	312½	354¾	241	252¾	146	70,600	651,500	Allied Chem. & Dye	No	2,178,109	6.00	11.11	10.03
123½	121½	...	...			2,400	29,300	7% pfd.	100	392,849	7%		62.59
9⅝	9⅜	23⅝	9¼	26	15⅜	19,800	134,800	Am. Agricultural Chem.	100	333,221	...		1.59
38½	38¼	73¾	38¼	79⅞	55⅜	15,200	47,700	pfd.	100	284,552	...		7.86
169⅝	165½	184½	107¾	117½	70½	961,800	3,373,100	American Can	.25	2,473,998	3.00		4.11
138½	138	142	136½	147	136¾	3,400	33,800	pfd.	100	412,333	7%		31.66
45	43½	55	42½	87⅞	74	113,200	237,200	Amer. Com. Alc.	No	77,000	...	8 mo. 6.96	..
73	72	81¾	50	63¾	39	306,100	1,868,000	American Metal, Ltd.	No	595,114	*3.00	9 mo. 2.30	3.64
126	126	135	113⅜	117½	109	2,000	29,300	pfd	100	99,907	6%	9 mo. 18.92	50.27
114¾	111	130¼	93½	293	169	441,600	3,241,400	American Smelt. & Refin.	100	609,980	4.00	6 mo. 10.61	19.64
135½	135⅜	138	130	142	131	4,400	28,700	pfd.	100	500,000	7%	6 mo. 16.44	30.96
20	19½	49¼	19½	57	6⅜	27,700	591,300	Amer. Zinc & Lead	25	193,120	...		...
98½	97½	111¼	90½	117⅞	40	13,800	73,500	pfd.	25	96,560	...		d2.72
118½	115¼	140	99	120¼	53¾	4,206,000	26,681,700	Anaconda Copper Mining	50	3,302,817	6.00		3.37
40¼	39½	49½	29	112⅞	55½	59,300	419,000	Archer Dan. Mid.	No	213,712	4.00	7.34	5.77
102¾	102	...	...				2,120	pfd.	100	43,000	7%	16.94	37.39
135⅞	127¼	140	90	114	63	93,200	199,700	Atlas Powder Co.	No	261,438	4.00	6.30	5.75
104	103	...	...	110½	102	360	4,770	pfd.	100	90,000	6%	6 mo. 10.83	22.71
59¾	58⅝	77⅞	53½	66½	50	284,700	5,618,500	Atlantic Refining	25	2,222,222	1.00	9 mo. 21.72	1.83
4	3⅞	9½	3⅞	12¼	4⅛	31,100	330,600	Butte Copper & Zinc	5	600,000	...		0.10
7⅝	7⅜	12⅜	6¼	16¾	8¾	4,700	138,500	Butte Superior Mng.	10	290,198	2.00	9 mo. 0.16	0.94
40⅞	38	41½	31⅛	122	65	100,100	302,900	By Product Coke	No	189,936	*5.00	9 mo. 5.78	5.68
2	2	4	1½	5⅜	1¾	23,200	229,500	Calla Lead & Zinc	10	724,592	...	9 mo. ...	0.10
41⅛	41⅛	61⅞	36⅝	47⅜	20⅛	113,200	2,165,300	Calumet & Hecla	25	2,005,502	2.50	9 mo. 0.95	0.29
27⅞	27⅛	32	16½	119	61½	24,100	272,300	Certainteed Prod.	No	400,000	...	9 mo. ...	5.31
74	72	...	...	63½	23⅛	100	8,800	7% pfd.	100	62,904	7%	9 mo. 0.87	56.80
100	92	...	...	74⅛	37⅜	1,200	1,332,600	Chile Copper	25	4,415,497	3.00	6 mo. 1.96	2.51
294	280	299	121¼	134¾	79	89,000	581,100	Columb Carbon	No	402,131	...	9 mo. 5.24	4.83
626	616⅜	700	225¼	250½	137⅞	47,500	444,700	Commercial Solvents	No	217,722	8.00	13.19	9.25
87¾	85½	92	60	64⅛	53	623,900	3,364,000	Cont. Can	No	1,420,000	5.00		7.21
125¼	123	...	...	128	123		2,280	pfd.	100	51,125	7%		86.82
115⅜	112⅛	118¾	82	94	64⅜	360,200	1,602,600	Corn Products	25	2,530,000	2.00	4.52	4.01
142	140½	...	...	146¾	138½	490	25,520	pfd.	100	250,000	7%	9 mo. 35.63	42.40
52	51¼	69⅛	42⅞	68¾	34⅜	160,200	1,257,500	Davison Chem.	No	480,000	...		6.21
46½	45	64⅞	43½	61	40	6,800	156,200	Devoe & Rayn A	No	110,000	2.40	6 mo. †5.95	†5.03
114	111½	...	...	120	108	290	2,390	1st pfd.	100	17,473	7%	6 mo. 34.71	53.23
117	115¾	...	...	121½	114	13,200	57,400	Dupont deb.	100	904,539	6%	9 mo. 57.79	57.03
193¾	188½	231	155¼	503	310	362,600	1,319,900	Dupont de Nemours	No	10,068,281	*14.75	20.89	15.45
224½	216	227⅜	168	194½	163	152,800	467,000	Eastman Kodak	No	2,057,560	*8.00		9.61
124¾	123¾	...	...	132¼	123½	340	2,860	pfd.	100	61,657	6%		326.68
240	225	...	...	230	120	300	7,200	Fed. Mining & Smelting	100	50,400	...		23.36
...	...	...	...	89⅜	65	39,400	3,278,000	Fleischmann	No	4,500,000	*5.00	9 mo. 3.24	4.30
43¾	43¼	54⅞	37¾	109½	43	115,400	703,300	Freeport Texas	No	729,844	4.00	4.49	5.12
84½	80¾	94¾	61	94⅞	141½	53,700	872,100	General Asphalt	100	206,887	...	6 mo. ...	4.74
125	123¼	141	104½	150	132	1,200	42,200	pfd.	100	68,742	5%	6 mo. d5.09	19.34
54⅞	53⅞	64⅛	36⅞	37	20⅜	130,600	1,214,600	Glidden Com.	No	500,000	*2.00	3.37	2.88
104	104	106⅛	101⅛	105	95	730	6,890	prior pfd.	100	69,167	7%	32.69	23.91
69⅞	67	82	53½	143¼	71	553,300	4,351,700	Gold Dust	No		2.50		8.97
120¼	120¼	...	...	380	192		4,470	Hercules Powder	No	147,000	14%	22.04	16.32
120	120			125	118½		1,280	pfd.	100	114,241	7%	9 mo. 24.69	28.05
65½	65½	79½	62	84	64½	10,600	87,900	Household Prod.	No	575,000	*4.00	6 mo. 2.64	5.22
7	7	17⅞	6½	20⅞	13	11,800	162,400	Intern. Agri.	No	450,000			1.34
58	56⅜	...	...	85	48⅜	1,200	18,500	pfd.	100	100,000	7%		13.03
58⅞	56¼	72⅞	40⅛	46	41⅛	1,410,600	12,384,700	Intern. Nickel	No	1,673,384	3.00	9 mo. 4.72	3.30
59	58½	63	43⅞	60	47⅛	23,600	112,000	Int. Print Ink	No	256,022	2.50	5.22	4.98
75½	75½	90	55½	69	49½	230	74,300	Intern. Salt	100	60,771	...	7.23	5.38
198	190¾	242¾	152½	202	96½	417,100	2,614,700	Johns-Mansville	No	750,000	3.00	6.75	4.78
87	85½	113⅞	71⅜	124½	63⅜	59,800	605,400	Liquid Carbonic Corp.	No	125,000	4.00	7.05	5.90
38½	38½	46	34	57⅞	45	13,600	54,300	Mac and Forbes	No	378,500	*3.50	9 mo. 2.34	3.62
67⅞	65½	72⅜	42½	190	117⅞	141,100	553,280	Mathieson Alk.	No	147,207	6.00	13.04	10.93
122	122	...	...	130	115	270	3,020	pfd	100	24,750	7%	9 mo. 63.03	74.06
41½	40½	54½	30½	33	17⅜	93,900	1,551,700	Miami Copper	5	747,116	2.00		1.53
47⅞	46	58	33	58½	29½	77,500	874,700	National Dist. Prod.	No	168,000	...		...
...	...	...	...	...	...		243,900	pfd. tem. ctfs.	...	...	...		...
184	180	194¾	132	136	115	44,200	195,840	National Lead	100	309,831	5%		8.90
100½	100	103	43			58,300	131,400	Newport Co.	50	130,000			
56½	54	60½	38	41½	22⅜	73,700	592,000	Penick & Ford	No	433,773	...	9 mo. 1.32	1.76
375	371	...	...	217	157	12,300	160,500	Peoples Gas Chi	100	511,521	8%	9 mo. 8.98	10.81
34	32	...	...			16,700	1,339,400	Royal Baking, new com	100	800,000	1.00	.83	1.14
119½	112½	...	...			100	8,800	pfd.	100	100,000	6%	6 mo. 7.26	15.11
40½	40½	45	35½	9⅜	6½	25,500	2,235,600	Spencer Kellogg	No	500,000	1.60	3.59	2.37
65	63½	94	59½	71½	37	161,200	246,800	St Joseph Lead	10	1,950,509	*3.00		2.06
74½	73½	83	48	59⅜	37⅜	2,944,400	8,759,600	Standard Oil Co. of N. J.	25	24,419,219	*1.50		1.52
43⅜	42½	48⅜	37⅜	45⅜	28⅜	1,303,600	5,941,500	Standard Oil Co. of N. Y.	25	17,118,931	1.60		0.67
17⅞	17⅛	20⅞	16	19⅜	10⅛	157,400	975,600	Tenn. Cop. & Chem.	No	794,626	1.00	1.54	0.51
68	67⅛	85⅛	67⅜	82⅜	62½	240,700	3,289,000	Texas Gulf Sulfur	No	2,540,000	4.00	5.72	4.76
125	121½	140	75⅛	209	186½	640,000	3,942,400	Union Carbide	No	2,742,072	6.00	11.15	9.53
215	205⅞	226½	128	138	102½	261,700	1,437,500	U. S. Ind. Alc.	No	320,000	6.00	10.29	7.26
...	...	...	...	125⅞	118⅜		860	pfd.	100	60,000	7%	6 mo. 19.12	36.03
85½	83	116½	68	111½	60	237,800	1,620,400	Vanadium Corp.	No	376,637	*4.00	4.53	4.97
10½	10	24⅞	9½	20⅜	12	22,800	544,100	Virginia Car. com.	No	486,700	...	0.69	...
35½	35½	65½	35	64⅞	44⅜	9,200	112,320	6% pfd.	100	213,392	...	7.57	d5.41
...	...	...	...	99½	88⅜	500	11,000	7% pfd.	100	125,000	7%	20.09	d1.70

NEW YORK CURB

1929 Sept. 30 High	1929 Sept. 30 Low	1929 High	1929 Low	1928 High	1928 Low	Sales In Sept.	Sales Since Jan. 1	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1928	Earnings $-per share-$ 1927
19	18½	23	6	31½	16½	5,800	23,100	Acetol Prod.	No	60,000	2.40		8.69
36	32½			42⅜	33½	3,100	41,400	Agfa Ansco	No	300,000	...		
410	410	539½	146	197½	120	6,750	82,250	Aluminum Co. of America	No	1,472,625	...		3.28
107	105½	...	...	110½	104	3,900	23,700	pfd.	100	1,472,625	6%		9.28
55⅞	52½	69½	39½	65	30⅜	273,500	1,206,000	Amer. Cyan.	20	3,000,000	8%	†3.67	†2.92
32½	31½	37	31½	28⅜	11⅜	4,000	163,000	Amer. Sol. & Chem. com	No	1,250,000	...	1.58	0.07
...	...			47⅜	25½	800	79,200	pfd.	No	500,000	...	6.52	3.17
34½	33½	45½	33	54	26½	8,500	156,600	Anglo Chile Nitrate	No	1,756,750	...	6 mo.. ...	...
5½	5½	10½	4⅜	33⅜	7	6,900	110,500	Br. Celanese	No	2,650,000	...	0.55	...
20	15			46½	41	700	1,300	Canad. Ind. Alc.	No	1,092,915	1.52	†2.87	†2.49
31	31	57½	25½	103	36½	12,500	117,200	Celanese Corp. of Am	No	1,000,000	...		1.72
35	31	...	...	122	34	200	4,900	Celluloid Co.	No	194,952	...	1.17	0.87
...	...	...	...	132	103½		2,400	1st pfd.	No	23,882	7.00		11.94
				97½	75			7% pfd.	No	24,551	7.00		9.96
79⅞	79	80⅞	63	92	75	13,300	66,700	Colgate-Palmolive Peet			2.00		
								Courtaulds	£1	12,000,000	22½%		26.55%
...	...	...	...	24⅞	20	2,700	45,100	Am. dep-rects	...	...	...		...

1929 Sept. 30 High	Low	1929 High	Low	1928 High	Low	Sales In Sept.	Sales Since Jan. 1	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1928	1927
...	...	...	...	23	7½	300	15,300	Heyden Chem.	10	150,000	...	2.02	1.01
7⅝	7⅝	11⅛	7½	...	...	1,200	1,800	Imperial Chem. Ind.					
...	...	...	...	98	38½		2,100	Monroe Chem.					
80	73	...	...	...	...	1,900	5,025	Monsanto Chem.	No	160,000	2.50	8.59	6.11
...	...	...	...	...	...	300	300	Penn Salt	50	150,000	5.00	8.27	8.09
8¼	8¼	10⅞	7	9⅞	6¼	2,200	43,900	Pyrene Mfg.	10	219,470	.80		0.70
91	90	105⅝	81	...	...	625	6,600	Sherwin Williams	20	594,445	4.00	6.99	6.42
29¾	29	48¼	20⅞	111¼	103	15,600	483,400	Silica Gel	No	600,000	...		
				92	65½			Snia Viscosa	120 lire	8,333,333	...		3.01 lire
...	...	...	...	29	17	900	1,100	dep-recpts	...	...	...		...
...	...	...	...	10	5⅞	7,100	37,600	Swift & Co.	100	1,500,000	8%	9.87	8.13
...	...	...	...	42	31½	1,870	20,595	Tubize "B"	No	78,858	10.00		
37⅛	37⅛	61½	30	150½	125	11,400	78,300	United Chem., pfd.	50	120,000	3.00		
...	...	...	...	630	450		151,740	com.	No	102,000			
83⅛	83	91⅜	56	100	53⅞	20,900	267,400	U. S. Gypsum	20	691,502	1.60	7.22	10.08
...	...	...	...	...	...		21,500	Westvaco Chlorine Prod.	No	200,000	2.00	3.60	
								CLEVELAND					
...	...	...	...	147½	104	1,227	23,127	Cleve-Cliff Iron	No	400,000	4.00		9.74
495	480	...	...	225	112¼	692	1,772	Dow Chem.	No	1,000,000	6.00		
105	105	...	...	107	103⅞	220	684	pfd.	100	30,000	7%		
				...	...			Glidden	No	500,000	*2.00	3.37	2.88
104	104	...	...	104⅞	96	20	2,720	prior pfd.	100	69,167	7%	32.69	23.91
91	91	...	...	95	65½	1,080	15,280	Sherwin Williams	25	594,445	4.00	6.99	6.42
105½	105½	...	...	109½	106	597	5,597	pfd.	100	125,000	6%	39.21	37.82
...	...	...	...	28	24⅞	144	2,244	Wood Chemical Prod. "A"	No	20,000	2.00		7.75
								CHICAGO					
18	18	...	...	96	91½	600	21,050	Monroe Chem.	100	167,500	...		4.74
78	77	...	...	146	127½	15,100	67,327	Monsanto Chem.	No	160,000	2.50	8.59	6.11
137½	137¾	...	...	...	..	22,950	68,750	Swift & Co.	100	1,500,000	8%	9.87	8.13
84½	83¾	...	...	...	...	81,350	352,450	U. S. Gypsum	20	691,502	1.60	6 mo. 4.42	10.08
...	...	...	...	100	55	150	67,150	United Chemicals, pfd.	50	120,000	3.00		
								CINCINNATI					
...	...	...	...	...	...		602	Fleishmann pfd.	100	12,200	6%	9 mo. 1,197.09	1,589.49
86½	85⅞	...	...	300	249	14,114	45,714	Proc. & Gam.	20	1,250,000	8.00	11.96	11.38
								PHILADELPHIA					
...	...	...	...	109½	92	11,000	24,300	Penn. Salt	50	150,000	5.00	8.27	8.09
53⅞	51½	...	...	173½	114¼	19,428	1,879,828	United Gas Imp.	50	3,903,791	6.00		6.28
								MONTREAL					
5	4½	...	...	...	...	1,256	36,456	Asbestos Corp.	No	200,000	...		0.87
18	18	...	...	...	...	415	10,815	pfd.	100	74,564	7%		9.32
19	18	...	...	..	...	18,379	185,979	Canada Ind. Alc.	No	1,092,915	1.52	†2.87	†2.49
105¼	102½	...	...	...	...	66,432	552,632	Shawinigan W. & P.	No	1,844,700	2.00		2.41
								BALTIMORE					
				28⅞	17			Silica Gel	No	600,000	...		
								UNLISTED					
...	...	...	...	80	70			Agfa Ansco, pfd.	100	50,500	...		...
...	...	...	...	375	190			Hercules Powd., com.	No	147,000	14%	9 mo. 15.10	16.36
86	81	...	...	82	64			Merck. & Co., pfd.	100	33,950	...		...

*Includes extra dividends. †Class A and class B shares combined. d Deficit.

The Industry's Bonds

1929 Sept. 30 High	Low	1929 High	Low	1928 High	Low	Sales In Sept.	Sales Since Jan. 1	ISSUE	Date Due	Int. %	Int. Period	Orig. (1) Offering $
								NEW YORK STOCK EXCHANGE				
105	105	...	...	106⅞	104	93	805	Am. Agri Chem.	1941	7½	F. A.	30,000
96¼	96¼	...	...	97	92	114	1,101	Amer. Cyanid	1942	5	A. O.	
112¾	112	...	...			1,362	2,078	Amer. I. G. Chem.				
99⅜	99	...	...	102⅞	99⅞	181	2,193	Am. Smelt & Refin "A" 5%	1947	5	A. O.	...
...	...	...	...	105⅛	92	125	2,406	Anglo Chilean	1945	7	M. N.	16,500
100½	100¼	...	...	103⅞	99⅞	168	1,027	Atlantic Refin.	1937	5	J. J.	15,000
...	...	...	...	103½	100	35	246	By product Coke	1945	5½	M. N.	8,000
...	...	...	...	103⅛	100	20	81	Corn Product Refin.	1934	5	M. N.	10,000
104¾	104¾	...	...	117	106	102	779	General Asphalt	1939	6	A. O.	5,000
...	...	...	...	95⅞	89½	2	151	Int. Agric. Corp.	1932	5	M. N.	30,000
...	...	...	...	86¼	77	3	96	Int. Agri. Corp. stamped. extended	1942	5	M. N.	7,020
...	...	...	...			1,252	1,652	Lautaro Nitrate				
...	...	...	...	...	...	53	1,365	Montecatini	1937	7	J. J.	
...	...	...	...	...	...	61	1,491	Ex War	1937	7	J. J.	
...	...	...	...	...	...	3	89	People's Gas & Coke	1943	6	A. O.	10,000
...	...	...	...	108⅛	102	124	563	Refunding	1947	5	M. S.	40,000
100⅛	100	...	...	104	102	518	4,100	Standard Oil N. J.	1946	5	F. A.	120,000
...	...	...	...	120	101⅛	60	641	Tenn. Cop. and Chem.	1941	6	A. O.	3,000
...	...	...	...	91⅞	82	6	110	Va. Iron C. & C.	1949	5	M. S.	
								NEW YORK CURB				
...	...	...	...	103½	100			Alum. Co. of Am 52	1952	5	M. S.	
100½	100	102½	100	121½	98	213	2,357	Amer. Com. Alc.	1943	5	M. N.	
...	...	...	...	125	99	33	1,499	Amer. Solv. & Chem.	1936	6	M. S.	
95	95	100½	93	101⅞	97½	242	2,320	Koppers Gas and Coke	1947	5	J. D.	25,000
...	...	...	...	103½	98	2	343	Natl. Dist. Prod.	1935	6½	J. D. 15	3,500
90	90	94¾	88½	98⅞	93½	122	1,333	Shawinigan W & P.	1967	4½	A. O.	
...	...	...	...	106⅞	100	6	244	Silica Gel. 6½% with warr.	1952	6½		
...	...	...	...	100	95	82	457	Solvay Am. Invest. Corp.	1942	5	M. S.	15,00
98⅞	98¼	100½	98¼	101⅛	99⅞	206	2,294	Swift & Co.	1932	5	A. O.	50,00
...	...	...	...	104	99½	55	420	Westvaco Chlorine Prod.	1937	5½	M. S.	2,50

The Trend of Prices

Industrial Advance Seasonally Smaller Than Usually Expected

Chemical Industry Does Not Experience Boost of Activity Usually Associated With Coming of Fall—Explanation Probably Lies in Fact That Business Has Been Unusually Good Throughout Summer.

While production in basic industries increased somewhat the advance was less than is usual and the index of industrial production, which makes allowance for seasonal changes, showed a decline, during the past month.

This industrial condition, according to the Federal Reserve Board, was accompanied by a slight decline in wholesale prices and a rapid increase in loans for commercial and agricultural purposes at member banks in leading cities between the middle of August and the middle of September. Security loans also increased, while investments declined.

During the month of August there was a reduction in the output of iron and steel and copper, and a slight decline in the production of automobiles. Meat-packing establishments were also somewhat less active during the month, while seasonal increases were reported in the production of textiles and shoes, coal and cement, flour and sugar, and petroleum output continued to expand. A slight increase in the number of workers employed in factories was accompanied by a substantial increase in pay rolls. This increase was especially notable in industries manufacturing products for the Autumn retail trade, such as clothing and furniture.

For the first two weeks of September reports indicate further decline in steel operations; reduction in lumber output resulting in part from the Labor Day holiday; and a continued seasonal rise in coal production.

The September report of the Department of Agriculture indicates a corn crop of 2,456,000,000 bushels, 13 per cent less than in 1928 and 11 per cent under the five-year average. The estimated wheat crop of 786,000,000 bushels is substantially below last year, but only slightly less than the five-year average. Cotton production, estimated on Aug. 1 at 15,543,000 bales, is now expected to total 14,825,000 bales, slightly above last year.

Freight-car loadings increased seasonally in August, as a consequence of larger shipments of all classes of freight except grains, which moved in smaller volume than in July, when shipments of wheat were unusually large. In comparison with 1928 total car loadings showed an increase of 5 per cent.

Wholesale prices showed a slight downward movement in August, according to the index of the Bureau of Labor Statistics. This reflected chiefly declines in the prices of farm products, especially grains and flour, livestock and meats. Woolens and worsteds also decreased in price, while silk and rayon materials were higher. There was a decline in prices of iron and steel and automobiles, and a further decrease in prices of petroleum and its products, especially gasoline. Coal prices advanced during the month.

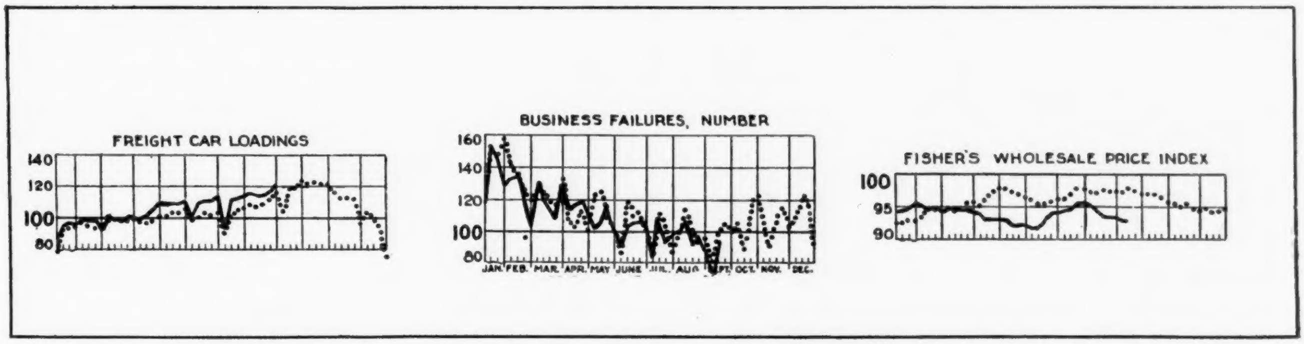
In the middle of September the prices of grains, beef, raw sugar, silk, and coal were higher than at the end of August, while prices of hogs, pork, and cotton were somewhat lower.

Between the middle of August and the middle of September there was a further rapid increase in loans for commercial and agricultural purposes at member banks in leading cities. Security loans also increased, while investments continued to decline.

During the first half of September the volume of reserve bank credit outstanding was about $120,000,000 larger than in the middle of the year. The increase was for the most part in the reserve banks' acceptance holdings and reflected chiefly growth in the demand of currency, partly seasonal in character. Discounts for member banks, following the increase over the holiday period early in September, declined at the time of the Treasury financial operations around the middle of the month, and on Sept. 18 were at a lower level than at any time since last June.

Open market rates on prime commercial paper increased from a range of 6-6¼ to a prevailing level of 6¼ during the first week in September, while acceptance rates remained unchanged.

During the past month, the chemical industry has not experienced that great increase in activity which it had come to expect with the opening of the Fall season. This has not been due, however, to the fact that business is less active than last year at this time, but merely that business has been so good throughout the year that there has been no summer slump of any kind. Aside from the impending opening of the contract season, chief interest has centered in the fast increasing acetone and methanol production. Just how far reaching the consequences and readjustments will be is at present undetermined, but much thought and consideration is being given the matter, especially by producers of wood alcohol.



Business indicators prepared by the Department of Commerce. The weekly average 1923-925 inclusive = 100. The solid line represents 1929 and the dotted line 1928.

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Sept. 1929 $1.041

Acetone — Competition is becoming more evident in this market as the increased production continues to make itself felt to a greater degree. Quoted prices for both the synthetic and fermentation material remain unchanged but competitive conditions undoubtedly exist, which makes it rather difficult to maintain prices at quoted levels. However, the work being done to promote welded buildings and to increase the size of motion picture films is an encouraging sign to producers, along with research now proceding in other lines which, if worked out practically, would greatly enlarge any previously existing market for acetone. The situation as it presently exists is in no sense startling, but merely that the individual producer does not find it quite so easy to find a market for his material with quite the ease which formerly characterized this commodity.

Acid Acetic — With decisive suddenness a shortage of calcium acetate has once more brought the annual tight condition into the market for this acid. With curtailment of activities of the wood distillers due to excessive accumulation of charcoal stocks, there has been a tremendous drop in supplies of lime available. The situation seems very likely to continue tight for the balance of the year despite relief from imports of both acid and raw material which are coming in in increasing quantities. The wood distillers are facing further complications in the rather precarious position of wood alcohol due to increasing production of the synthetic methanol. The entire situation finds a focus in the acetic acid market and both producers and consumers must prepare for a condition of shortage which bids fair to exist throughout the present year. Producers are frank in stating that they expect to be unable to meet demands within a short time.

Acid Chromic — Since the decline in price, somewhat better inquiry has been noted in this market and larger quantities are reported to be moving into consuming channels.

Acid Oxalic — Demand continues to increase apace with the result that the market is very firm although quoted prices are being held without any upward

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.26	.18½	.24	.24	Acetaldehyde, dr s 1c-1 wks...lb.	.18½	.21	.21	.18½
				Acetaldol, 50 gal dr..........lb.	.27	.31	.31	.27
.24	.23	.20	.20	Acetanilid, tech, 150 lb bbl...lb.	.23	.24	.24	.23
.35	.29	.29	.29	Acetic Anhydride, 92-95%, 100 lb cbys..................lb.	.29	.35	.35	.29
.....	.....	.38	.32	Acetin, tech drums..........lb.	.30	.32	.32	.30
.15	.13	.12	.12	Acetone,...................lb.	.14	.16	.16	.14
1.75	1.65	1.65	1.65	Acetone Oil, bbls NY.......gal.	1.15	1.25	1.25	1.15
.45	.42	.42	.42	Acetyl Chloride, 100 lb cby...lb.	.55	.68	.68	.45
				Acetylene Tetrachloride (see tetrachlorethane).............				
				Acids				
3.88	3.38	3.38	3.38	Acid Acetic, 28% 400 lb bbls c-1 wks.............100 lb.	.....	3.88	3.88	3.88
13.68	11.92	11.92	11.92	Glacial, bbl c-1 wk.....100 lb.	.....	13.68	13.68	13.68
1.00	.98	.98	.98	Anthranilic, refd, bbls........lb.	.98	1.00	1.00	.98
.80	.80	.80	.80	Technical, bbls............lb.	.....	.80	.80	.80
2.25	1.60	1.60	1.25	Battery, cbys...........100 lb.	1.60	2.25	2.25	1.60
.60	.57	.57	.57	Benzoic, tech, 100 lb bbls....lb.	.57	.60	.60	.57
.11	.08½	.08½	.08½	Boric, crys. powd, 250 lb. bbls..................lb.	.05¾	.06½	.06½	.05¾
1.25	1.25	1.25	1.25	Broenner's, bbls............lb.	.....	1.25	1.25	1.25
.90	.85	.85	.80	Butyric, 100% basis cbys.....lb.	.85	.90	.90	.85
4.85	4.85	4.90	4.85	Camphoric.................lb.	.....	4.85	4.85	4.85
.28	.13	.25	.25	Carbolic, 10%, 50 gal bbls....lb.	.13	.14	.14	.13
.16	.15	.15	.15	Chlorosulfonic, 1500 lb drums wks....................lb.	.04½	.05½	.05½	.04½
.30	.25	.37	.25	Chromic, 99%, drs extra.....lb.	.17½	.19	.23	.17½
1.06	1.00	1.00	1.00	Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.06	1.00
.44½	.59	.44½	.43	Citric, USP, crystals, 230 lb. bbls..................lb.	.46	.59		.46
.97	.95	.95	.95	Cleve's, 250 lb bbls..........lb.	.52	.54	.59	.52
.70	.68	.60	.57	Cresylic, 95%, dark drs NY..gal.	.60	.70	.54	.60
.72	.72	.70	.60	97-99%, pale drs NY.....gal.	.72	.77	.77	.72
.12	.11	.11	.10	Formic, tech 90%, 140 lb. cby...................lb.	.11¼	.11½	.11½	.10½
.55	.50	.50	.50	Gallic, tech, bbls............lb.	.50	.55	.12	.50
.74	.74	.74	.69	USP, bbls................lb.	.....	.74	.55	.74
1.06	1.00	1.00	1.00	Gamma, 225 lb bbls wks.....lb.	.80	.85	.74	.74
.63	.57	.57	.57	H, 225 lb bbls wks..........lb.	.65	.70	.99	.80
.67	.67	.67	.65	Hydriodic, USP, 10% soln cby lb.	.....	.67	.72	.67
.48	.45	.45	.45	Hydrobromic, 48%, coml, 155 lb cbys wks............lb.	.45	.48	.67 .48	.45
				Hydrochloric, CP, see Acid Muriatic....................			.....	.....
.90	.80	.80	.80	Hydrocyanic, cylinders wks...lb.	.80	.90	.90	.80
.06	.06	.06	.06	Hydrofluoric, 30%, 400 lb bbls wks...................lb.	.....	.06	.06	.06
.11	.11	.11	.11	Hydrofluosilicic, 35%, 400 lb bbls wks...............lb.	.....	.11	.11	.11
.85	.85	.85	.85	Hypophosphorous, 30%, USP, demijohns..............lb.	.....	.85	.85	.85
.06	.04¾	.05½	.05½	Lactic, 22%, dark, 500 lb bbls lb.	.04¼	.05	.05¼	.04¼
.13½	.12	.13	.13	44%, light, 500 lb bbls......lb.	.11	.11½	.12½	.11
.54	.52	.52	.52	Laurent's, 250 lb bbls........lb.	.40	.42	.42	.40
.60	.48	.....	.....	Malic, powd., kegs...........lb.	.48	.60	.60	.48
.65	.60	.60	.60	Metanilic, 250 lb bbls........lb.	.60	.65	.65	.60
.08	.07¾	.07¾	.07¾	Mixed Sulfuric-Nitric.......... tanks wks..........N unit	.07	.07½	.07½	.07
.01½	.01	.01	.01	tanks wks..........S unit	.008	.01	.01	.008
.21	.18	.21	.18	Monochloroacetic, tech bbl..lb.	.18	.21	.21	.18
.65	.65	1.65	1.65	Monosulfonic, bbls..........lb.	1.65	1.70	1.70	1.65
1.40	1.35	1.35	1.35	Muriatic, 18 deg, 120 lb cbys c-1 wks.............100 lb.	.....	1.35	1.40	1.35
				tanks, wks. 100 lb.		1.00	1.00	1.00
1.80	1.70	1.70	1.70	20 degrees, cbys wks...100 lb.	.....	1.45	....	1.45
.95	.85	.95	.95	N & W, 250 lb bbls............	.85	.95	.95	.85
.59	.55	.55	.55	Naphthionic, tech, 250 lb.......	.....	Nom.	.59	.55
5.00	5.00	5.00	5.00	Nitric, 36 deg, 135 lb cbys c-wks................100 lb.	.....	5.00	5.00	5.00
6 00	6.00	6.00	6.00	40 deg, 135 lb cbys, c-1 wks................100 lb.	.....	6.00	6.00	6.00
.11½	.10¾	.11½	.11	Oxalic, 300 lb bbls wks NY...lb.	.11	.11½	.11½	.11
.08½	.08	.08	.07	Phosphoric 50%, 150 lb cby..lb.	.08	.08½	.08½	.08
.16	.16	.19	.16	Syrupy, USP, 70 lb drs....lb.	.....	.16	.16	.16
.50	.50	.50	.50	Picramic, 300 lb bbls........lb.	.65	.70	.70	.65
.50	.40	.45	.30	Picric, kegs.................lb.	.40	.50	.50	.40
.86	.86	.86	.86	Pyrogalic, technical, 200 lb bbls...................lb.	.....	.86	.86	.86
.32	.27	.27	.27	Salicylic, tech, 125 lb bbl.....lb.	.37	.42	.42	.37
.16	.15	.15	.15	Sulfanilic, 250 lb bbls........lb.	.15	.16	.16	.15
1.95	1.60	1.60	1.60	Sulfuric, 66 deg, 180 lb cbys 1c-1 wks............100 lb.	1.60	1.95	1.95	1.60
				tanks, wks. ton		15.50	15.50	15.50
1.37½	1.20	1.20	1.20	1500 lb dr wks......100 lb.	1.50	1.65	1.65	1.50
1.12½	1.12½	1.10	1.10	60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.42½	1.27½
1.52½	1.52½	1.50	1.50	Oleum, 20%, 1500 lb. drs 1c-1 wks ....100 lb.	.....	1.52½	1.52½	1.52½

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Sept. 1929 $1.041

revision. Imports are increasing constantly with figures for the first seven months showing a total of 597,778 pounds imported as compared with 410,913 pounds for the corresponding period of last year. It is pointed out that the unusual demand is due to the new use of this material in the coal industry. Consequently the abnormal increase in consumption is only a temporary one over any period of time for as soon as present stocks of coal are treated, the demand will fall away to more normal volume. For then, material will only be needed for treatment of new coal as mined. It is this, together with treatment of all stocks on hand, which is occasioning the bulk of the new demand. Consumption of oxalic will be increased, but nothing like to the extent indicated by present demands.

Acid Sulfuric — Although production continues in large volume, producers have had no opportunity to build up any reserves as industry generally continues its heavy demand for this material. Sulfuric continues to lead the way, but all mineral acids are in excellent position with excellent demand and steady prices. The past two years have been perhaps the steadiest ever existing in this market.

Alcohol — Has been moving in good volume and with the Fall season rapidly approaching, with first touches of cooler weather, producers seem quite optimistic concerning the coming demand for this material. Production is well sold up for the remainder of the year and producers emphasize the necessity of ordering early in order to facilitate prompt delivery. They point out that some delay is inevitable if consumers all wait and place their orders at the same time.

Ammonium Chloride — As is expected at this season of the year, demand is improving with prices unchanged. The falling off in consumption which has been expected ever since the introduction of the electric radio, is beginning to be noticeable with a little falling off in demand as compared with last year. This was not noticeable for the first six months but there is slight indication that the first nine months will slow a slight loss. The percentage however, will be so small as to be insignificant although it is expected to mark an ever-increasing tendency. The months of peak consumption are October and November and more will be known of definite nature at that time.

Ammonium Sulfate — Formerly a very busy month in the fertilizer year, the past month has been characterized by but little action of any sort in this market. Prices continue at $2.10 % $2.20 per 100 lbs. Export demand has been moderate

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
42.00	42.00	42.00	42.00	40%, lc-1 wks net ....ton	.....	42.00	42.00	42.00
.40	.30	.30	.30	Tannic, tech, 300 lb bbls...lb.	.30	.40	.40	.30
.38	.34½	.37	.29½	Tartaric, USP, crys, powd, 300 lb. bbls............lb.	.38	.38½	.38½	.38
.85	.85	.85	.85	Tobias, 250 lb bbls ....lb.	.....	.85	.85	.85
2.75	2.75	2.75	2.00	Trichloroacetic bottles......lb.	.....	2.75	2.75	2.75
2.00	2.00	2.00	2.00	Kegs...................lb.	.....	2.00	2.00	2.00
1.25	1.00	1.00	1.00	Tungstic, bbls...........lb.	2.00	2.25	2.25	1.00
.55	.43	.45	.45	Albumen, blood, 225 lb bbls..lb.	.43	.47	.47	.43
				dark, ...bbls., lb.	.12	.20	.20	.12
.84	.78	.95	.80	Egg, edible..............lb.	.74	.77	.83	.70
.80	.70	.92	.77	Technical, 200 lb cases ..lb.	.70	.75	.80	.70
.65	.60	.60	.60	Vegetable, edible..........lb.	.60	65	.65	.60
.55	.50	.50	.50	Technical.............lb.	.50	.55	.55	.50
				Alcohol				
.20	.18½	.20	.19	Alcohol Butyl, Normal, 50 gal drs c-1 wks............lb.	.17½	.18½	.17½	.17½
.19½	.18¾	.20½	.19½	Drums, 1-c-1 wks.......lb.	.17¾	.18¾	.18½	.17¾
.19	.17¾	.19½	.18½	Tank cars wks..........lb.	.16¾	.17¾	.17½	.16¾
2.25	1.75	.....	.....	Amyl (from pentane) drs c-1 wks...........gal.	.....	1.67	1.67	1.67
1.80	1.70	1.70	1.70	Diacetone, 50 gal drs del ..gal.	1.70	1.80	1.80	1.70
3.70	2.65	3.70	3.70	Ethyl, USP, 190 pf, 50 gal bbls...............gal.	.....	2.69½	2.69½	2.69½
.55	.50	.50	.50	Anhydrous, drums.......gal.	.....	.71	.71	.71
.52	.48½	.52	.37½	Completely denatured, No. 1, 190 pf, 50 gal drs drums extra...............gal.	.....	.52	.52	.49
.50	.43	.50	.29	No. 5, 188 pf, 50 gal drs. drums extra.........gal.	.....	.51	.51	.48
.46	.41	.46	.25	Tank, cars.............gal.	.....	.49	.49	.46
1.25	1.00	1.00	1.00	Isopropyl, ref, gal drs.....gal.	1.05	1.30	1.30	1.00
1.00	1.00	1.00	1.00	Propyl Normal, 50 gal dr..gal.	.....	1.00	1.00	1.00
.82	.80	.80	.80	Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.82	.80
.65	.65	.65	.65	Alpha-Naphthol, crude, 300 lb bbls..................lb.	.....	.65	.65	.65
.37	.35	.35	.35	Alpha-Naphthylamine, 350 lb bbls..................lb.	.32	.34	.34	.32
3.30	3.25	3.25	3.15	Alum Ammonia, lump, 400 lb bbls, lc-1 wks.......100 lb.	3.25	3.30	3.30	3.25
5.50	5.25	5.25	5.25	Chrome, 500 lb casks, wks ....100 lb.	5.00	5.25	5.50	5.00
3.20	3.10	3.50	3.10	Potash, lump, 400 lb casks wks................100 lb.	3.00	3.10	3.20	3.00
5.50	5.25	5.25	5.25	Chrome, 500 lb casks wks ....100 lb.	5.25	5.50	5.50	5.25
3.75	3.75	3.75	3.75	Soda, ground, 400 lb bbls wks................100 lb.	.....	3.75	3.75	3.75
26.00	24.30	27.00	26.00	Aluminum Metal, c-1 NY.100 lb.	.....	24.30	24.30	24.30
.40	.35	.35	.35	Chloride Anhydrous, 275 lb drums.................lb.	.....	.05	.40	.05
.18	.17	.17	.17	Hydrate, 96%, light, 90 lb bbls..................lb.	.17	.18	.18	.17
.24	.18	.23	.23	Stearate, 100 lb bbls.......lb.	.25	.26	.26	.25
1.75	1.75	1.75	1.75	Sulfate, Iron, free, bags c-1 wks.............100 lb.	1.95	2.05	2.05	1.95
1.40	1.40	1.40	1.35	Coml, bags c-1 wks..100 lb.	.....	1.40	1.40	1.40
1.15	1.15	1.15	1.15	Aminoazobenzene, 110 lb kegs lb.	.....	1.15	1.15	1.15
				Ammonium				
.14	.13½	.13½	.10	Ammonia, anhyd, 100 lb cyl..lb.	.14	.14	.14	.14
.03	.03	.03	.02½	Water, 26°, 800 lb dr del...lb.	.....	.03½	.03½	.03½
				Bicarbonate, bbls., f.o.b. plant ....100 lb.	.....	5.15	6.50	5.15
.22	.21	.21	.21	Bifluoride, 300 lb bbls......lb.	.21	.22	.22	.21
.09	.08¾	.08¾	.08¾	Carbonate, tech, 500 lb cs..lb.	.09	.12	.12	.09
5.15	4.45	5.05	4.85	Chloride, white, 100 lb. bbls wks.............100 lb.	4.45	5.15	5.15	4.45
5.75	5.25	.07	.05½	Gray, 250 lb bbls wks....lb.	5.25	5.75	5.75	5.25
.11½	.11	.11	.11	Lump, 500 lb cks spot...lb.	.11	.11½	.11½	.11
.16	.15	.15	.15	Lactate, 500 lb bbls.......lb.	.15	.16	.16	.15
.10	.06	.06	.06	Nitrate, tech, casks........lb.	.06	.10	.10	.06
.38	.27½	.27½	.27½	Persulfate, 112 lb kegs.....lb.	.31	.34	.34	.31
.18	.18	.18	.18	Phosphate, tech, powd, 325 lb bbls.................lb.	.12½	.13	.13	.12½
2.90	2.20	2.30	2.55	Sulfate, bulk c-1.......100 lb.	2.10	2.20	2.40	2.05
3.00	2.50	2.55	2.35	Southern points.....100 lb.	2.10	2.20	2.45	2.05
60.85	60.85	59.70	56.85	Nitrate, 26% nitrogen 31.6% ammonia imported bags c. i. f.........ton	.....	53.50	60.85	52.40
.60	.55	.55	.55	Sulfocyanide, kegs........lb.	.36	.48	.48	.36
2.25	1.72	2.25	1.90	Amyl Acetate, (from pentane) drs...................gal.	1.60	1.70	1.70	1.60
.....	.....	.....	.....	Tech., drs...............gal.	1.60	1.70	1.70	1 60
				Alcohol, see Fusel Oil........				
				Furoate, 1 lb tins.........lb.		5.00		
.16½	.15½	.15½	.15	Aniline Oil, 960 lb drs........lb.	.15½	.16½	.16½	.15½
.48	.41	.41	.41	Annatto, fine...............lb.	.34	.37	.37	.34
1.00	.90	.90	.90	Anthraquinone, sublimed, 125 lb bbls...................lb.	.80	.90	.90	.80
.12	.09½	.11½	.14	Antimony, metal slabs, ton lots ....lb.	.....	.08¾	.10	.08¾
.12	.10	.15½	.14	Needle, powd, 100 lb cs....lb.	.....	.10	.10	.09
.18	.17	.17	.17	Chloride, soln (butter of) cbys.....................lb.	.17	.18	.18	.17
.12	.09¾	.16½	.16½	Oxide, 500 lb bbls.........lb.	.....	.08¾	.10	.08¾
.....	.....	.28	.25½	Salt, 66%, tins............lb.	.25½	.26	.26	.25½
.20	.16	.20	.16	Sulfuret, golden, bbls......lb.	.16	.20	.20	.16
.42	.38	.42	.37½	Vermilion, bbls............lb.	.38	.42	.42	.38
.19	.17	.18	.18	Archil, conc, 600 lb bbls......lb.	.17	.19	.19	.17
.14	.12	.12	.12	Double, 600 lb bbls........lb.	.12	.14	.14	.12
.16	.15	.16	.14	Triple, 600 lb bbls.........lb.	.15	.16	.16	.15
.08	.08	.15	.12½	Argols, 80%, casks..........lb.	.....	.08	.08	.08
.16	.15	.08	.03	Coude, 30%, casks........lb.	.15	.16	.16	.15
.11	.10½	.10½	.10½	Arsenic, Red, 224 lb kegs, cs..lb.	.09	.11	.11	.09
.04	.03¾	.04	.03½	White, 112 lb kegs........lb.	.04	.04½	.04½	.04
14.75	14.75	14.75	14.75	Asbestine, c-1 wks.........ton	.....	15.00	15.00	4.75

Prices Current and Comment

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Exports during July totaled 11,582 tons as compared with 11,329 tons for July 1928. Exports for the first seven months of the current year were much larger than for the corresponding period of last year. From January through July, exports totaled 71,248 tons which compares with only 59,843 tons for the same period of last year.

Antimony — Has been quiet and steady during the past month and prices have varied but little. Metal is now at 8¾c lb., while needle is at 10c lb., and oxide at 8¾c lb.

Barium Chloride — Steady demand continues from the color and tanning industries. The market seems definitely set in a stable position and prices have remained unchanged for a year.

Benzene — Some easing off in the steel industry has naturally been reflected in this market. However, there is a very steady undercurrent with producers reporting good demand. Benzol exports from the United States during July amounted to 4,635,674 gallons, valued at $1,105,793, an increase of 270 per cent in quantity and 325 per cent in value when compared with July, 1928, outgoing shipments which amounted to 1,236,398 gallons, value $259,740. The average July, 1929, export price was 23.8 cents per gallon and for July, 1928, the average was 21 cents. Exports during the seven months ending July, 1929, totaled 21,666,720 gallons, value $5,315,814 against 12,562,126 gallons with a value of $2,757,580 during the corresponding period in 1928.

Blood — Prices at New York have declined to $4.40 per unit in the face of but little demand.

Butyl Acetate — Is reported moving in large volume with brisk demand evidently in anticipation of the holiday buying. Butyl acetate imports into the United States, entered for consumption, in the first half of 1929 were more than double in quantity and value those during the same period of 1928. A total of 4,398,181 pounds, valued at $553,726, were entered for consumption in the January-June period of 1929, as against 1,673,521 pounds, valued at $225,938 in the corresponding period of 1928. The following table shows imports for consumption during each month of the present year: January, 302,823 pounds, value $39,103; February, 934,698 pounds, value $122,131; March, 1,023,146 pounds, value $127,545; April, 639,373 pounds, value $80,004; May, 782,534 pounds, value $96,830; June, 715,607 pounds, value $88,110.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
				Barium				
57.00	47.00	47.50	47.50	Barium, Carbonate, 200 lb bags wks....ton	58.00	60.00	60.00	57.00
.12½	.12	.12	.12	Chlorate, 112 lb kegs NY..lb.	.14	.15	.15	.14
65.00	54.00	65.00	57.50	Chloride, 600 lb bbl wks...ton	65.00	69.00	69.00	63.00
.13½	.13	.13	.13	Dioxide, 88%, 690 lb drs...lb.	.12	.13	.13	.12
.04¾	.04¾	.04½	.04½	Hydrate, 500 lb bbls.......lb.	.04¾	.05½	.05½	.04¾
.08	.07½	.07½	.07½	Nitrate, 700 lb casks.......lb.	.08½	.08½	.08½	.08½
24.00	23.00	23.00	23.00	Barytes, Floated, 350 lb bbls wks....ton	23.00	24.00	24.00	23.00
8.00	5.00	.....	.....	Bauxite, bulk, mines........ton	5.00	8.00	8.00	5.00
.38	.36	.40	.37	Beeswax, Yellow, crude bags..lb.	...34	.35	.37	.34
.43	.41	.46	.38	Refined, cases..........lb.	.....	.40	.42	.41
.58	.56	.58	.56	White, cases.............lb.	.51	.53	.53	.51
.70	.65	.65	.65	Benzaldehyde, technical, 945 lb drums wks.............lb.	.60	.65	.65	.60
				Benzene				
.23	.21	.23	.21	Benzene, 90%, Industrial, 8000 gal tanks wks..........gal.	.....	.23	.23	.23
.23	.21	.23	.21	Ind. Pure, tanks works....gal.	.....	.23	.23	.23
.74	.70	.70	.70	Benzidine Base, dry, 250 lb bbls..................lb.	.70	.74	.74	.70
1.00	1.00	1.00	1.00	Benzoyl, Chloride, 500 lb drs.lb.	.....	1.00	1.00	1.00
.25	.25	.....	.....	Benzyl, Chloride, tech drs....lb.	.....	.25	.25	.25
.26	.24	.24	.24	Beta-Naphthol, 250 lb bbl wk.lb.	.24	.26	.26	.24
1.35	1.35	1.35	1.35	Naphthylamine, sublimed, 200 lb bbls..................lb.	.....	1.35	1.35	1.35
.65	.63	.63	.63	Tech, 200 lb bbls..........lb.	.60	.65	.68	.60
90.00	80.00	80.00	80.00	Blanc Fixe, 400 lb bbls wks..ton	80.00	90.00	90.00	80.00
				Bleaching Powder				
2.25	2.25	2.25	2.00	Bleaching Powder, 300 lb drs c-1 wks contract.......100 lb.	.....	2.25	2.25	2.25
2.00	2.00	2.25	2.00	700 lb drs c-1 wks contract ....100 lb.	.....	4.00	4.00	4.00
5.25	4.65	3.75	4.75	Blood, Dried, fob, NY......Unit	.....	4.40	4.60	4.00
5.35	4.75	.....	.....	Chicago................Unit	.....	5.00	5.00	4.40
5.05	4.50	.....	.....	S. American shipt.......Unit	.....	4.50	4.70	4.25
.35	.31	.30	.28	Blues, Bronze Chinese Milori Prussian Soluble........lb.	.....	.35	.35	.32
30.00	29.00	38.00	29.00	Bone, raw, Chicago.........ton	.....	42.00	42.00	42.00
.07	.06	.06	.06	Bone, Ash, 100 lb kegs.......lb.	.06	.07	.07	.06
.08½	.08½	.08½	.08½	Black, 200 lb bbls.........lb.	.....	.08½	.08½	.08½
37.00	31.00	30.00	28.00	Meal, 3% & 50%, Imp....ton	.....	31.00	35.00	30.00
.05	..2½	.04½	.04½	Borax, bags...............lb.	.02½	.03½	.03½	.02½
.12	.10½	.11	.11	Bordeaux, Mixture, 16% pwd..lb.	.10½	.12	.12	.10½
.10	.08	.08	.08	Paste, bbls...............lb.	.10	.10½	.10½	.10
28.00	26.00	28.00	26.00	Brazilwood, sticks, shpmt....lb.	26.00	28.00	28.00	26.00
1.20	.60	.60	.60	Bronze, Aluminum, powd blk.lb.	.60	1.20	1.20	.60
1.25	.55	.55	.55	Gold bulk...............lb.	.55	1.25	1.25	.55
1.60	1.40	1.60	1.42	Butyl, Acetate, normal drs... ....lb.	18.9	19.3	19.3	18.4
1.55	1.35	1.55	1.42	Tank, wks...............lb.	.....	18.6	18.6	18.1
.70	.70	.70	.70	Aldehyde, 50 gal drs wks...lb.	.....	.70	.70	70
				Carbitol s ee Diethylene Glycol Mono (Butyl Ether)........	.....	.....	.....	.....
				Cellosolv e (see Ethylene glycol mono b utyl ether).........				
				Furoate, tech., 50 gal. dr., lb.	.....	.50	.50	.50
.36	.34	.34	.34	Propionate, drs...........lb.	.34	.36	.36	.34
.60	.60	.60	.60	Stearate, 50 gal drs........lb.	.....	.60	.60	.60
.60	.57	.57	.57	Tartrate, drs..............lb.	.57	.60	.60	.57
2.00	1.35	1.50	1.35	Cadmium, Sulfide, boxes.....lb.	.95	1.75	1.75	.75
				Calcium				
4.50	3.50	3.50	3.50	Calcium, Acetate, 150 lb bags c-1................100 lb.	.....	4.50	4.50	4.50
.09	.06	.07½	.07½	Arsenate, 100 lb bbls c-1 wks....................lb.	.07	.09	.09	.07
.06	.05	.05	.05	Carbide, drs..............lb.	.05	.06	.06	.05
1.00	1.00	1.00	1.00	Carbonate, tech, 100 lb bags c-1.....................lb.	1.00	1.00	1.00	1.00
27.00	25.00	27.00	27.00	Chloride, Flake, 375 lb drs c-1 wks...............ton	.....	22.75	25.00	22.75
23.00	20.00	21.00	21.00	Solid, 650 lb drs c-1 fob wks ....ton	20.00	20.00	20.00	20.00
52.00	52.00	52.00	52.00	Nitrate, 100 lb bags.......ton	.....	42.00	52.00	42.00
.....	.....	.....	.....	Peroxide, 100 lb. drs.......lb.	.....	1.25	1.25	1.25
.08	.07	.09	.09	Phosphate, tech, 450 lb bbls lb.	.08	.08½	.08	.07
				Stearate, 100 lb bbls.......lb.	.25	.26	.26	.25
				Calurea, bags S. points. c.i.f. ton	.....	83.65	[83.65	82.15
.18	.18	.....	.....	Camwood, Bark, ground bbls..lb.	.....	.18	.18	.18
.28	.22	.33	.33	Candelilla Wax, bags........lb.	.22	.24	.24	.22
				Carbitol, (See Diethylene Gycol Mono Methyl Ether).......	.....	.....	.....	.....
.15	.08	.08	.08	Carbon, Decolorizing, 40 lb bags c-1....................lb.	.08	.15	.15	.08
.12	.12	.12	.12	Black, 100-300 lb cases 1c-1 NY....................lb.	.....	.12	.12	.12
.06	.05½	.05½	.05½	Bisulfide, 500 lb drs 1c-1 NY....................lb.	.05½	.06	.06	.05½
.06	.06	.06	.06	Dioxide, Liq. 20-25 lb cyl...lb.	.....	.06	.06	.06
.07½	07	.07	.07	Tetrachloride, 1400 lb drs delivered...............lb.	.06½	.07	.07½	.06½
.58	.45	.50	.50	Carnauba Wax, Flor, bags....lb.	.36	.37	.43	.39
.60	.40	.90	.54	No. 1 Yellow, bags........lb.	.....	.35	.40	.34½
.38	.34	37	.24	No. 2 N Country, bags.....lb.	.....	.28	.32	.28
.56	.38	.68	.48	No. 2 Regular, bags.......lb.	.32	.33	.36	.32
.32	.25	.....	.....	No. 3 N. C...............lb.	.....	.25	.25	.24
.32	25½	.....	.....	No. 3 Chalky.............lb.	.....	.25	.26	.25
.18¼	.14½	.18½	.15½	Casein, Standard, ground.....lb.	.15½	.16	.16	.15

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Sept. 1929 $1.041

Calcium Acetate — Increasingly heavy imports feature this market as domestic curtailment of production becomes increasingly pronounced. The curtailment of activities among wood distillers due to accumulated stocks of charcoal has brought about a scarcity which is causing producers of acetic acid to fall behind in deliveries. Despite heavy imports the supply is far behind demand and seems likely to continue so throughout the year. Imports of crude calcium acetate entered for consumption during the first six months of 1929 more than doubled those for the corresponding period in 1928. From January, 1929, to June, inclusive, 7,447,572 pounds, value $314,687, were entered for consumption as against 3,705,951 pounds, value $123, 470, in the first half of 1928. During the calendar year 1928, there were entered for consumption 9,005,809 pounds of crude calcium acetate, value $316,416; in 1927 there were entered 6,893,052 pounds, value $225,508 and in 1926 incoming shipments aggregated 4,934,390 pounds, valued at $154,724. A heavy decline is noted in exports from the United States of acetate of lime. In July only 120 pounds, valued at $10, were shipped out, the seven months total aggregating 88,546 pounds, value $5,862. These figures are in striking contrast to those for the same period of 1928 when 9,502,685 pounds, valued at $311,552, were exported.

Outbound cargoes of acetate of lime have been falling off in recent years, as will be seen from the following tabulation: 1924, 23,166,759 pounds, value $733,137; 1925, 22,038,213 pounds, value $684,577; 1926, 18,588,831 pounds, value $626,446; 1927, 11,633,785 pounds, value $409,060; 1928, 11,172,685 pounds, value $373,278.

Carbon Black — Total production of carbon black in 1928 amounted to 248, 790,000 pounds, an increase over 1927 of 50,361,000 pounds, or 25 per cent, and the total sales for the year were 280,579, 000 pounds, an increase over 1927 of 57,149,000 pounds, or 26 per cent. The production in 1928 had a total value at the plants of $13,782,000, or an average of 5.54 cents per pound; this represents little change in average value but, because of the sizeable increase in output, it represents a material gain in total value over 1927. Stocks of carbon black held by producers at their plants continued to decline and on Dec. 31, 1928, amounted to 50,240,000 pounds, as compared with 82,831,000 pounds on hand at the beginning of the year. Of the total sales (280,579, 000 pounds) of carbon black by producers in 1928, 77,903,000 pounds, or 28 per

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
				Cellosolve (see Ethylene glycol mono ethyl ether).........				
				Acetate (see Ethylene glycol mono ethyl ether acetate)..				
.30	.26	.34	.26	Celluloid, Scraps, Ivory cs....lb.	.26	.30	.30	.26
.20	.18	.18	.18	Shell, cases...............lb.	.18	.20	.20	.18
.32	.30	.34	.26	Transparent, cases........ lb.	.30	.32	.32	.30
1.40	1.40	1.40	1.40	Cellulose, Acetate, 50 lb kegs .lb.	1.20	1.25	1.25	1.20
.03¾	.03	.03	.03	Chalk, dropped, 175 lb bbls...lb.	.03	.03¾	.03¾	.03
.04½	.04½	.02¾	.02½	Precip, heavy, 560 lb cks...lb.	.02	.03½	.03½	.02
.03½	.02¾	.04½	.04½	Light, 250 lb casks........lb.	.02¾	.03½	.03½	.02¾
.19	.18	.18	.18	Charcoal, Hardwood, lump, bulk wks...................bu.	.18	.19	.19	.18
.06½	.06	.06	.06	Willow, powd, 100 lb bbl wks..................lb.	.06	.06½	.06½	.06
.05	.04	.04	.04	Wood, powd, 100 lb bbls...lb.	.04	.05	.05	.04
.03	.02	.03	.02½	Chestnut, clarified bbls wks,..lb.	.02½	.03	.02	.03½
02	.01½	.02	.01½	25% tks wks.............lb.	.01¾	.02½	.02½	.01½
.04 4/5	.04 4/5	.05½	.05½	Powd, 60%, 100 lb bgs wks.lb.	.....	.04 4/5	.04 4/5	.04 4/5
.06	.05½	.06½	.06½	Powd, decolorized bgs wks..lb.	.05½	.06	.06	.05½
9.00	8.00	8.00	8.00	China Clay, lump, blk mines.ton	8.00	9.00	9.00	8.00
.02	.01¾	.01¾	.01¾	Powdered, bbls...........lb.	.01¾	.02	.02	.01¾
12.00	10.00	10.00	10.00	Pulverized, bbls wks......ton	10.00	12.00	12.00	10.00
25.00	15.00	15.00	15.00	Imported, lump, bulk.....ton	15.00	25.00	25.00	15.00
.03½	.03	.03	.03	Powdered, bbls...........lb.	.03	.03½	.03½	.03
				Chlorine				
.09	.08	.08	.08	Chlorine, cyls 1c-1 wks contract ....lb.	.07½	.08½	.08½	.07½
.....	.....	.....	.....	cyls, cl wks,. contract ...lb.	.....	.04½	.04½	.04½
.03½	.03½	.05½	.04	Liq tank or multi-car lot cyls wks contract...........lb.	.....	.03	.03	.03
.07	.07	.07	.07	Chlorobenzene, Mono, 100 lb. drs 1c-1 wks...........lb.	.08½	.09½	.09½	.08½
.22	.20	.20	.20	Chloroform, tech, 1000 lb drs..lb.	.....	.16	.20	.16
1.35	1.00	1.00	1.00	Chloropicrin, comml cyls.....lb.	1.00	1.35	1.35	1.00
.29	.26	.27	.26	Chrome, Green, CP..........lb.	.26	.29	.29	.26
.11	.06½	.06½	.06½	Commercial...............lb.	.06½	.11	.11	.06½
.17	.15½	.17½	.16½	Yellow..................lb.	.17	.18	.18	.15
.05¾	.04¾	.05	.04½	Chromium, Acetate, 8% Chrome bbls..................lb.	.04¾	.05¾	.05¾	.04¾
.05½	.05½	.05½	.05½	20° soln, 400 lb bbls.....lb.	.....	.05½	.05½	.05½
.28	.27	.27	.27	Fluoride, powd, 400 lb bbl..lb.	.27	.28	.28	.27
.35½	.34½	.34½	.34½	Oxide, green, bbls.........lb.	.34½	.35½	.35½	.34½
9.50	9.00	9.50	9.00	Coal tar, bbls..............bbl	10.00	10.50	10.50	10.00
2.22	2.10	2.10	2.10	Cobalt Oxide, black, bags....lb.	2.10	2.22	2.22	2.10
.87	.84	.92	.77	Cochineal, gray or black bag..lb.	.....	.95	.95	.95
.86	.86	.92	.77	Teneriffe silver, bags.......lb.	.....	.95	.95	.95
				Copper				
17.00	12.90	13.57½	12.90	Copper, metal, electrol...100 lb.	.....	17.78	24.00	17.00
.17½	.16	.16¾	.06½	Carbonate, 400 lb bbls.....lb.	.13	.21½	.25	.13
.28	.28	.28	.28	Chloride, 250 lb bbls.......lb.	.25	.28	.28	.25
.50	.48	.48	.48	Cyanide, 100 lb drs........lb.	.50	.55	.60	.48
.17	.16½	.16½	.16½	Oxide, red, 100 lb bbls.....lb.	.24	.32	.32	.16½
.19	.18	.18	.17	Sub-acetate verdigris, 400 lb bbls..................lb.	.18	.19	.19	.18
5.50	5.05	5.00	4.75	Sulfate, bbls c-1 wks...100 lb.	.....	6.00	7.00	5.65
14.00	13.00	17.00	13.00	Copperas, crys and sugar bulk c-1 wks................ton	13.00	14.00	14.00	13.00
1.35	1.25	1.25	1.25	Sugar, 100 lb bbls.....100 lb.	1.25	1.35	1.35	1.25
.42	.40	.40	.40	Cotton, Soluble, wet, 100 lb bbls..................lb.	.40	.42	.42	.40
.....	.....	42.00	20.00	Cottonseed, S. E. bulk c-1...ton	.....	.....	.....	.....
.....	.....	42.00	20.00	Meal S. E. bulk..........ton	.....	.....	.....	.....
38.00	36.00	35.00	21.50	7% Amm., bags mills...ton	37.50	38.00	38.00	37.50
.27½	.26	.27	.22	Cream Tartar, USP, 300 lb. bbls..................lb.	.....	.26½	.28	.26½
.42	.40	.40	.40	Creosote, USP, 42 lb cbys....lb.	.40	.42	.42	.40
.19	.17	.20	.20	Oil, Natural, 50 gal drs....gal.	.17	.19	.19	.17
.23	.21	.25	.25	10-15% tar acid........gal.	.21	.23	.23	.21
.28	.25	.....	.....	25-30% tar acid........gal.	.25	.28	.28	.25
.20	.17½	.17½	.17½	Cresol, USP, drums..........lb.	.14	.17	.17	.14
				Crotonaldehyde, 50 gal dr....lb.	.32	.36		
.17	.16	.17	.16	Cudbear, English............lb.	.16	.17	.17	.16
.18½	.18½	.18½	.15	Cutch, Rangoon, 100 lb bales..lb.	.14	.16	.16	.14
.07	.06	.05	.05½	Borneo, Solid, 100 lb bale..lb.	.08	08½	.08½	.08
1.75	1.67½	1.82½	1.67½	Cyanamide, bulk c-1 wks Amm. ....lb.	.....	1.70	1.70	1.70
5.12	3.77	3.92	3.77	Dextrin, corn, 140 lb bags.100 lb.	4.72	4.92	4.92	4.62
5.07	3.72	3.87	3.72	White, 130 lb bags.....100 lb.	4.67	4.87	4.87	4.57
.09	.08	.08½	.08½	Potato, Yellow, 220 lb bgs..lb.	.08	.09	.09	.08
.09	.08	.08½	.08½	White, 220 lb bags 1c-1....lb.	.08	.09	.09	.08
.08¼	.08	.08¼	.08	Tapioca, 200 lb bags 1c-1...lb.	.08	.08¼	.08¼	.08
.....	.....	3.80	3.80	Diaminophenol, 100 lb kegs...lb.	.....	3.80	3.80	3.80
3.80	3.80	2.95	2.85	Diamylphthalate, drs wks...gal.	.....	3.80	3.80	3.80
2.90	2.85	3.25	3.25	Dianisidine, 100 lb kegs......lb.	3.00	3.10	3.10	3.00
.28	.26½	.31½	.29½	Dibutylphthalate, wks.......lb.	.....	.26½	.26½	.26½
.31½	.29½	.55	.55	Dibutyltartrate, 50 gal drs....lb.	.29½	.31½	.31½	.29½
.....	.....	.....	.....	Dichloroethylether, 50 gal drs lb.	.05	.07	.13	.05
.65	.55	.23	.23	Dichloromethane, drs wks....lb.	.55	.65	.65	.55
.25	.23	2.15	2.15	Diethylamine, 400 lb drs.....lb.	2.75	3.00	3.00	2.75
2.15	2.15	1 85	1.85	Diethylcarbonate, drs ......gal.	1.85	1.90	1.90	1.85
2.00	1.85	.55	.55	Diethylaniline, 850 lb drs.....lb.	.55	.60	.60	.55
.60	.55.	20	.20	Diethyleneglycol, drs........lb.	.10	.12	.13	.10
.15	.10	.....	.....	Mono ethyl ether, drs....lb.	.13	.15	.15	.13
.35	.25	.....	.....	Mono butyl ether, drs....lb.	.28	.30	.30	.25
							.15	.13
.....	.....	.....	.....	Mono methyl ether, 50 gal. dr...................lb.	.15	.18	.22	.15
.....	.....	.....	.....	Diethylene oxide, 50 gal dr....lb.	.....	.50	.50	.50
.67	.64	.64	.64	Diethylorthotoluidin, drs.....lb.	.64	.67	.67	.64
.26	.24	.25	.25	Diethyl phthalate, 1000 lb drums.................lb.	.24	.26	.26	.24
.35	.30	.30	.30	Diethylsulfate, technical, 50 gal drums.................lb.	.30	.35	.35	.30
2 62	2.62	2.60	2.60	Dimethylamine, 400 lb drs...lb.	....	2.62	2.62	2.62
.32	.30	.32	.30	Dimethylaniline, 340 lb drs...lb.	.30	.32	.32	.30

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Sept. 1929 $1.041

cent, was exported, leaving 202,676,000 pounds, or 72 per cent, as the domestic distribution, of which 140,938,000 pounds, or 70 per cent, was sold to rubber companies; 27,223,000 pounds, or 13 per cent, to ink companies; 20,040,000 pounds, or 10 per cent, to paint companies; and 14,475,000 pounds, or 7 per cent, for miscellaneous uses. The rubber industry is by far the largest consumer of carbon black, and the major portion of the increase in carbon-black output in recent years has been due to the growth in the number of automobile tires manufactured. During 1928 the rubber industry produced about 75,000,000 automobile tires, which with a distribution of 140,938,000 pounds of carbon black, would indicate a consumption of nearly 2 pounds of carbon black per tire.

Casein — Has started to advance during the past month due to good demand and increasing scarcity of material both in this market and in markets abroad. Prices were very firm in their advanced position and some heavy sales were recorded with many large buyers purchasing well ahead, because of the indications of a rising market to extend ahead for some time.

Copper Sulfate — As is customary at this season of the year, activity in this commodity is almost at a standstill. September and October are always quiet months and this year is no exception although somewhat better than last, due chiefly to considerable export activity. The export season is developing and considerable quantities have already been shipped to South America with further orders yet to go. Due to the fact that there is not a great deal of buying, there has been a tendency to shade prices in some quarters, but quoted figures have remained unchanged and seem quite likely to continue so. Copper, for the past five months and more, has been steadier than it has ever been. The price has not fluctuated for even a single day since the thirteenth of April.

Fish Scrap — This is the weak spot of the entire fertilizer market which seems to have had a weakening influence on the entire market. Is now quoted at $3.65 @ 10 per unit. In addition to the big catch, no real efforts were made to dispose of material, with the result that the market continued to drop, with no buyers in evidence. At the present level, which is the lowest which has prevailed for some years, there has been some revival of business interest, and factors look for the market to improve in tone very shortly.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.50	.45	.45	.45	Dimethylsulfate, 100 lb drs...lb.	.45	.50	.50	.45
.16½	.15½	.15½	.15	Dinitrobenzene, 400 lb bbls...lb.	.15½	.16½	.16½	.15½
.19	.18	.18	.18	Dinitrochlorine, 300 lb bbl....lb.	.18	.19	.19	.18
.16	.15	.15	.15	Dintrochlorobenzene, 400 lb bbls....lb.	.13	.15	.15	.1
.34	.32	.32	.32	Dinitronaphthalene, 350 lb bbls ....lb.	.34	.37	.37	.34
.32	.31	.31	.31	Dinitrophenol, 350 lb bbls....lb	.31	.32	.32	.31
.19	.18	.18	.15	Dinitrotoluene, 300 lb bbls...lb	18	.19	.19	.18
.90	.48	1.05	.85	Diorthotolyguanidine, 275 lb bbls wks....lb.	.42	.46	.49	.42
.....	.....	.....	.....	Dioxan (See Diethylene Oxide)	..	.....	.....	.....
				Diphenyl....lb.	.40	.50	.50	.40
.47	.45	.48	.45	Diphenylamine....lb.	.....	.40	.47	.40
.72	.40	.....	.....	Diphenylguanidine, 100 lb bbl lb.	.30	.35	.40	.30
.30	.26	.26	.26	Dip Oil, 25%, drums....lb.	.26	.30	.30	.26
62.00	58.00	49.00	41.00	Divi Divi pods, bgs shipmt..ton	.....	46.50	57.00	46.50
.05½	.05	.04	.04	Extract....lb.	.05	.05½	.05½	.05
.82	.73	.84	.72	Egg Yolk, 200 lb cases....lb.	.77	.79	.84	.77
1.75	1.7	2.00	1.75	Epsom Salt, tech, 300 lb bbls c-1 NY....100 lb.	1.70	1.90	1.90	1.70
.38	.37	.45	.37	Ether, USP, 1880, 50 lb drs..lb.	.38	.39	.39	.38
1.05	.75	.90	.90	Ethyl Acetate, 85% Ester, ... tanks....lb.	.....	12.2	12.2	12.2
1.25	1.10	1.10	1.03	drums....lb.	12.5	12.9	12.9	12.5
.....	.....	.....	.....	Acetoacetate, 50 gal drs....lb.	.65	.68	.68	.65
1.11	1.05	1.05	1.05	Benzylaniline, 300 lb drs...lb.	1.05	1.11	1.11	1.05
.70	.70	.50	.50	Bromide, tech, drums....lb.	.50	.55	.55	.50
.....	.....	.....	.....	Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.90	1.85
.22	.22	.22	.22	Chloride, 200 lb. drums....lb.	.....	.22	.22	.22
.....	.....	.....	.....	Chlorocarbonate, 50 gal dr.gal.	.35	.40	.40	.35
.....	.....	.....	.....	Ether, Absolute, 50 gal drs..lb.	.50	.52	.52	.50
				Furoate, 1 lb tins....lb.	.....	5.00	5.00	5.00
3.50	3.50	3.50	3.50	Lactate, drums works....lb.	.25	.29	.35	.25
.30	.30	.30	.30	Methyl Ketone, 50 gal drs..lb.	.....	.30	.30	.30
.55	.45	.45	.45	Oxalate, drums works....lb.	.45	.55	.55	.45
.36	.30	.....	.....	Oxybutyrate, 50 gal drs wks.lb.	.....	.30½	.36	.30
.70	.70	.70	.70	Ethylene Bromide, 60 lb dr...lb.	.....	.70	.70	.79
.85	.75	.75	.75	Chlorhydrin, 40%, 50 gal drs chloro. cont....lb.	.75	.85	.85	.75
.11	.07	.15	.11	Dichloride, 50 gal drums...lb.	.05	.07	.10	.05
.40	.25	.30	.30	Glycol, 50 gal drs wks....lb.	.25	.28	.30	.25
.27	.31	.....	.....	Mono Butyl Ether drs wks.	.23	.27	.31	.23
.20	.24	.....	.....	Mono Ethyl Ether drs wks	.16	.20	.24	.16
.23	.26	.....	.....	Mono Ethyl Ether Acetate dr. wks....	.19	.23	.26	.19
				Mono Methyl Ether, drs.lb.	.19	.23	.23	.1
				Oxide, cyl....lb.	.....	2.00		
.65	.62	.62	.62	Ethylidenaniline....lb.	.62	.65	.65	.62
25.00	20.00	20.00	20.00	Feldspar, bulk....ton	25.00	20.00	25.00	20.00
21.00	15.00	15.00	15.00	Powdered, bulk works....ton	15.00	.21	21.00	15.00
.09	.07½	.07½	.07½	Ferric Chloride, tech, crystal 475 lb bbls....lb.	.07½	.09	.09	.07
5.50&10	4.90&10	5.60	4.15	Fish Scrap, dried, wks....unit	.....	3.65&10	4.00&10	3.65&10
4.75&50	4.00&50	3.50	4.24	Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	3.50&50	4.00&50	3.50&50
1.15	1.10	1.10	.90	Flavine, lemon, 55 lb cases...lb.	1.10	1.15	1.15	1.10
1.15	1.10	1.10	.85	Orange, 70 lb cases....lb.	1.10	1.15	1.15	1.10
				Flaxseed....lb.	.....	.....		
.....	.....	.....	.....	Ex-dock....ton	.....	25.00	25.00	25.00
25.00	25.00	25.00	25.00	Fluorspar, 98%, bags....	41.00	46.00	46.00	41.00
				Formaldehyde				
.....	.....	.....	.....	Formaldehyde, aniline, 100 lb.	.....	.....	.....	.....
.42	.39	.39	.39	drums....lb.	.39	.42	.42	.39
.09	.08½	.11½	.08½	USP, 400 lb bbls wks....lb.	.08½	.09	.10	.08½
.04	.02½	.02½	.02½	Fossil Flour....lb.	.02½	.04	.04	.02½
20.00	15.00	15.00	15.00	Fullers Earth, bulk, mines..ton	15.00	20.00	20.00	15.00
30.00	25.00	25.00	25.00	Imp. powd c-1 bags....ton	25.00	30.00	30.00	25.00
.19½	.1 ½	.17½	.17½	Furfural 500 lb drums....lb.	.17½	.19½	.19½	.17½
.....	.....	.....	.....	Furfuramide (tech) 100 lb dr..lb.	.....	.30	.30	.30
.....	.....	.....	.....	Furfuryl Acetate, 1 lb tins....lb.	.....	5.00	5.00	5.00
.....	.....	.....	.....	Alcohol, (tech) 100 lb dr....lb.	.....	.50	.50	.50
.....	.....	.....	.....	Furoic Acid (tech) 100 lb dr...lb.	.....	.50	1.00	.50
1.35	1.35	1.69	1.35	Fusel Oil, 10% impurities...gal.	.....	1.35	1.35	1.35
.05	.04	.04	.04	Fustic, chips....lb.	.04	.05	.05	.04
.22	.20	.20	.20	Crystals, 100 lb boxes....lb.	.20	.22	.22	.20
.10	.09	.09	.09	Liquid, 50°, 600 lb bbls....lb.	.09	10	.10	.09
.23	.20	.20	.20	Solid, 50 lb boxes....lb.	.14	.16	.16	.14
32.00	30.00	30.00	30.00	Sticks....ton	25.00	26.00	26.00	25.00
.52	.50	.50	.50	G Salt paste, 360 lb bbls....lb.	.45	.50	.52	.45
21	.20	.20	.20	Gall Extract....lb.	.20	.21	.21	.20
.09	.08	.08	.06	Gambier, common 200 lb cs...lb.	.06	.07	.07	.06
.14	.12	.12	.12	25% liquid, 450 lb bbls....lb.	.12	.14	.14	.12
.12	.11	.23	.11	Singapore cubes, 150 lb bg..lb.	.08½	.09	.09	.08½
.50	.45	.45	.30	Gelatin, tech, 100 lb cases....lb.	.45	.50	.50	.45
3.24	3.14	3.14	3.14	Bags, c-1 NY....100 lb.	3.14	3.24	3.24	3.14
1.00	.70	1.05	1.05	Glauber's Salt, tech, c-1 wks....100 lb.	1.00	1.70	1.70	.70
3.34	3.24	3.24	3.24	Glucose (grape sugar) dry 70-80° bags c-1 NY....100 lb.	3.24	3.34	3.34	3.20
3.14	3.14	3.14	3.14	Tanner's Special, 100 lb bags ....100 lb.	.....	3.14	3.14	3.14
.24	.20	.20	.20	Glue, medium white, bbls...lb.	.20	.24	.24	.20
.26	.22	.22	.22	Pure white, bbls....lb.	.22	.26	.26	.22
.19	.15	.29	.22	Glycerin, CP, 550 lb drs....lb.	.14	.14½	.16	.13½
.15	.11¾	.25	.17	Dynamite, 100 lb drs....lb.	.11¾	.12	.12½	.10¼
.10¾	.08¾	.....	.....	Saponification, tanks....lb.	.07¾	.08	.08¾	.07½
.09¾	.07¾	.....	.....	Soap Lye, tanks....lb.	.06¾	.07	.07½	.06¾
35.00	15.00	15.00	15.00	Graphite, crude, 220 lb bgs...ton	15.00	35.00	35.00	15.00
.09	.06	.05	.05	Flake, 500 lb bbls....lb.	.06	.09	.09	.06
				Gums				
.04½	.03¾	.03¾	.03¾	Gum Accroides, Red, coarse and fine 140-150 lb bags....lb.	.03¾	.04½	.04½	.03
.06½	06	.06	.06	Powd, 150 lb bags....lb.	.06	.06½	.06½	.06¾

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Formaldehyde — Despite some inquiry for export material, the market continues in rather competitive condition. Demand is said to have improved somewhat during the past month but on the whole it is said to be below that which is normally expected at this season of the year.

Glycerine—Despite the close approach of colder weather when buying of this material for anti-freeze purposes should develop, the buying still continues in desultory fashion, despite valiant efforts on the part of sellers who late in the month advanced quotations ½c lb. The outstanding features of the second quarter of this year are the continued rise in the stocks in the U. S. A., the continued decline in prices, and the movements of glycerine between the various countries, says a report from London. Although the American supplies turned out to be more than sufficient, it is interesting to note that that country has nevertheless continued to import glycerine. The deduction from this fact appears to be that American buyers have purchased from foreign countries whenever the foreign glycerine could be obtained below domestic values. The imports into the U. S. A. during the second quarter were almost the same as during the first quarter and the quantity imported is well in excess of the increase in stocks registered during the fourth, fifth and sixth months. As regards the imports and exports of Germany, Holland, the U. K., and France for the first half of this year, they were in each case about double those of the first quarter. The export of distilled glycerine from the United Kingdom declined by 1,000 tons in the period under review, whereas crude glycerine exports increased from 954 tons to 1,611 tons. Generally speaking the markets on the whole have been very dull and uninteresting during this period and prices have continued to decline very slowly, the June values being £2 per ton below those for May, and a further decline of 20s to 30s during July and August was registered. At the time of going to press, however, signs of improvements are visible in the European market, especially for crude glycerine.

Gums — Very unfavorable crop reports have come in on both gum elemi and gum mastic, so that a rising market in these two materials seems inevitable. Although the extent of the damage is not quite clear, it is reported that much of the new gum elemi crop has been destroyed by a typhoon. The mastic crop is estimated to be about 35 to 40 per cent short of normal, due to the fact that the long drought was succeeded by such unusually heavy rains that this much of the crop was damaged.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.20	.18	.18	.18	Yellow, 150-200 lb bags....lb.	18	.20	.20	.18
.40	.35	.40	.35	Animi (Zanzibar) bean & pea 250 lb cases.............lb.	.35	.40	.40	.35
.55	.50	.60	.50	Glassy, 250 lb cases.......lb.	.50	.55	.55	.50
.12	.09	.09	.09	Asphaltum, Barbadoes (Manjak) 200 lb bags.............lb.	.09	.12	.12	.09
.17	.15	.15	.15	Egyptian, 200 lb cases.......lb.	.15	.17	.17	.15
65.00	55.00	55.00	55.00	Gilsonite Selects, 200 lb bags ....ton	58.00	65.00	65.00	58.00
.26	.22½	.26½	.26½	Damar Batavia standard 136, lb cases...................lb.	.22	.22½	.26	.22
.11	.10½	.10½	.07	Batavia Dust, 160 lb bags.....lb.	.10½	.11	.11	.10½
.17½	.16	.18½	.17½	E Seeds, 136 lb cases.......lb.	.16	.16½	.17½	.16
.14½	.13	.14	.09	F Splinters, 136 lb cases and bags..................lb.	.13	.13½	.13½	.13
.30½	.29½	.34	.33½	Singapore, No 1, 224 lb cases lb.	.26	.28	.30½	.26
.24	.20	.22½	.21	No. 2, 224 lb cases........lb.	.....	.21½	.24	.21½
.15	.13½	.14	.11	No. 3, 180 lb bags.........lb.	.10	.11½	.14	.10
.48	.33	.35	.30	Benzoin Sumatra, U. S. P. 120 lb cases..................lb.	.38	.40	.40	.38
.15	.14	.14	.12	Copal Congo, 112 lb bags, clean opaque................lb.	.16	.17	.17	.14
.09	.08¾	.08¾	.08¾	Dark, amber..............lb.	.08¾	.09	.09	.08¾
.14	.12½	.12½	.12½	Light, amber.............lb.	.12½	.14	.14	.12½
.36	.35	.35	.35	Water white..............lb.	.35	.36	.36	.35
65	.58	.....	.....	Mastic....................lb.	.58	.60	.62	.58
				Manila, 180-190 lb baskets				
.17½	.16	.16	.16	Loba A..................lb.	.17	.17½	.17½	.17
.16½	.15	.15	.15	Loba B..................lb.	.15½	.16	.16½	.15½
.14	.13	.14½	.13	Loba C..................lb.	.13½	.14	.14½	.13½
.19	.16	.16	.16	Pale bold, 224 lb cs........lb.	.17	.19	.19	.17
.13½	.12	.14	.12	Pale nubs...............lb.	.13	.13½	.13½	.13
.11	.07½	.07½	.07½	East Indies chips, 180 lb bags lb.	.10	.11	.11	.10
.21	.17	.....	.....	Pale bold, 180 lb bags....lb.	.20	.21	.21	.20
.16	.14	.17	.17	Pale nubs..............lb.	.15	.16	.16	.15
.....	.....	.....	.....	Pontianak, 224 lb cases....lb.	.....	.....		
.25½	.22	.29	.25	Pale bold gen No 1..... lb.	.20	.21	.23	.20
.15	.13	.19	.13	Pale gen chips spot......lb.	.14½	15	.15	.14½
.14	.13	.14	.13	Elemi, No. 1, 80-85 lb cs...lb.	.13½	.14	.14	.13½
.13½	.13	.13	.12	No. 2, 80-85 lb cases.....lb.	.13	.13½	.13½	.13
.13	.12	.13	.11	No. 3, 80-85 lb cases. ...lb.	.12	.13	.13	.12
.57	.50	.67½	.57	Kauri, 224-226 lb cases No. 1	.50	.57	.57	.50
.38	.35	.44½	.38	No 2 fair pale..........lb.	.35	38	.38	.35
.12	.10	.14½	.10	Brown Chips, 224-226 lb cases................lb.	.10	.12	.12	.10
.....	.....	.42	.38	Bush Chips, 224-226 lb	.....	.....		
.40	.38	.....	.....	cases................lb.	.38	.40	.40	.38
.....	.....	.....	.....	Pale Chips, 224-226 lb cases				
.26	.24½	.31½	.24½	......................lb.	.24½	.26	.26	.24½
.60	.26	.27	.25	Sandarac, prime quality, 200 lb bags & 300 lb casks...lb	.35	.36	.72	.35
.....	.....	.....	.....	Helium, 1 lit. bot. ....lit	.....	25.00	.20	.17
.20	.17	.12	.12	Hematine crystals, 400 lb bbls lb.	.17	.20	.11	.17
.11	.11	.09	.09	Paste, 500 bbls............lb.	.....	.11	.11	.11
.03¾	.03½	.03½	.03½	Hemlock 25%, 600 lb bbls wks lb.	.03½	.03¾	.03¾	.03½
16.00	16.00	16.00	16.00	Bark....................ton	.....	16.00	17.00	16.00
.60	.60	.60	.45	Hexalene, 50 gal drs wks......lb.	.....	.60	.60	.60
.56	.62	.80	.62	Hexamethylenetetramine, drs .lb.	.48	.50	.58	.48
4.00	4.00	3.35	2.75	Hoof Meal, fob Chicago....unit	.....	3.75	4.00	3.75
.....	.....	3.90	3.0	South Amer. to arrive....unit	.....	3.75	3.90	3.75
.26	.24	.30	.22	Hydrogen Peroxide, 100 vol, 140 lb cbys.................lb.	.24	.26	.26	.24
.15	.12	.12	.12	Hypernic, 51°, 600 lb bbls....lb.	.12	.15	.15	.12
1.30	1.28	1.28	1.20	Indigo Madras, bbls.........lb.	1.28	1.30	1.30	1.28
.18	.15	.15	.18	20% paste, drums.........lb.	.15	.18	.18	.15
.08	.07½	.07½	.07½	Solid, powder............lb.	.07½	.08	.08	.07½
				Iron Chloride, see Ferric or Ferrous				
.10	.09	.09	.09	Iron Nitrate, kegs...........lb.	.09	.10	.10	.09
3.25	2.50	2.50	2.50	Coml, bbls..........100 lb.	2.50	3.25	3.25	2.50
.12	.10	.10	.10	Oxide, English..........lb.	.10	.12	.12	.10
.03½	.02½	.02½	.02½	Red, Spanish...........lb.	.02½	.03½	.03½	.02½
.90	.85	.85	.85	Isopropyl Acetate, 50 gal drs gal.	.85	.90	.90	.85
.20	.17	.29	.17	Japan Wax, 224 lb cases......lb.	.....	.16½	.18	.16½
70.00	60.00	60.00	60.00	Kieselguhr, 95 lb bgs NY....ton	60.00	70.00	70.00	60.00
.....	.....	14.00	13.00	Lead Acetate, bbls wks...100 lb.	13.00	13.50	13.50	13.00
13.50	13.00	14.00	13.00	White crystals, 500 lb bbls wks...............100 lb.	14.00	14.50	14.50	14.00
.15	.13	.15½	.13½	Arsenate, drs 1c-1 wks.....lb.	.13	.15	.15	.13
				Dithiofuroate, 100 lb dr....lb.	.....	1.00		
6.25	6.25	7.80	6.20	Metal, c-1 NY........100 lb.	.....	7.75	7.75	6.10
.14	.14	.14	.14	Nitrate, 500 lb bbls wks....lb.	.....	.14	.14	.14
.18	.17½	.17½	.17½	Oleate, bbls..............lb.	.17½	.18	.18	.17½
.08¾	.08½	.10¾	.08¾	Oxide Litharge, 500 lb bbls.lb.	.....	.08¾	.08¾	.08½
.09¾	.09½	.11¼	.09¾	Red, 500 lb bbls wks....lb.	.....	.09¾	.09¾	.09½
.09	.09	.09¾	.09	White, 500 lb bbls wks...lb.	.....	.09½	.09½	.09
.08¼	.08¼	.09	.08¼	Sulfate, 500 lb bbls wk...lb.	.....	.08¾	.08¾	.08¼
				Leuna saltpetre, bags c.i.f. . . ton	.....	53.50	53.50	52.00
				S. points c. i. f.............ton	.....	53.80	53.80	52.30
4.50	4.50	4.50	4.50	Lime, ground stone bags.....ton	.....	4.50	4.50	4.50
1.05	1.05	1.05	1.05	Live, 325 lb bbls wks ...100 lb.	.....	1.05	1.05	1.05
				Lime Salts, see Calcium Salts				
.17	.15	.15	.15	Lime-Sulfur soln bbls........gal.	.15	.17	.17	.15
.06½	.06½	.06½	.06½	Lithopone, 400 lb bbls 1c-1 wks ....lb.	.....	.05¾	.06½	.05¾
.08½	.08¼	.08¼	.08¼	Logwood, 51°, 600 lb bbls.....lb.	.08¼	.08½	.08½	.08¼
.03½	.03	.03	.03	Chips, 150 lb bags.........lb.	.03	.03½	.03½	.03
.12½	.12½	.12	.12	Solid, 50 lb boxes.........lb.	.....	.12½	.12½	.12½
27.00	26.00	26.00	26.00	Sticks...................ton	24.00	26.00	26.00	24.00
.08	.07½	.07½	.07½	Lower grades.............lb.	.07½	.08	.08	.07½
.30	.30	.30	.30	Madder, Dutch..............lb.	.22	.25	.25	.22
50.00	48.00	48.00	48.00	Magnesite, calc, 500 lb bbl...ton	50.00	60.00	60.00	50.00
				Magnesium				
06½	.06	.06½	.06	Magnesium Carb, tech, 70 lb bags NY.................lb.	06	.06½	.06½	.06

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Although one report is from the Mediterranean and the other from Near East, it is quite likely that the effect will be the same in each case—advancing prices.

Mercury — With American production all sold up, foreign material continues to control the market, and the two factors, English brokers and Italo-Spanish producers, seem to be sparring for an opening. Meanwhile the market has been steady and regular, in all ways quite normal for this season of the year. Prices continue unchanged at quoted levels.

Methanol — Greatly increased production of synthetic material with resultant lower prices has necessitated considerable readjustment in this market. Just how far-reaching the consequences will be is as yet undetermined, but the most immediate reaction is a probable concentration of the wood distillers on the denaturing grade.

Phenol — A scarcity of material for prompt shipment continues to exist, but all reports of increased production are discounted on the ground that the demand has not yet become stabilized. That domestic material has been very scarce during this year is further evidenced by the tremendous gain thus far in imports of this material. During the seven months ending August, 1929, imports for consumption of phenol aggregated 168,159 pounds, a jump from 1,193 pounds during the whole year of 1928. In fact no imports of phenol were entered for consumption between August 1, 1928, and May 31, 1929. In 1927, only 500 pounds were brought in. Writing of conditions in the phenol market the "Chemical Trade Journal", London, says that the price fluctuations of the various coal tar products during the past few months have been of considerable interest. At the present time the market for carbolic acid crystals, as will have been noted from our market reports for some time past, has been reflecting a shortage which has now become quite acute and it will be noted that a further slight rise in the open market price has just taken place. The present condition of affairs seems to date from about last May, since when the material available has been inadequate to meet the demand. This is not confined to this country alone, but is being experienced throughout the world. At the present time the position appears to be that the tar distillers have had much less crude carbolic for disposal than usual, and coincidently has come a increased demand for crystals due in large measure to the growth in the quantities required for the manufacture of synthetic resins. As

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
37.00	27.00	37.00	27.00	Chloride flake, 375 lb. drs c-1 wks.....ton	.....	36.00	36.00	36.00
33.00	33.00	33.00	33.00	Important shipment.....ton	.....	33.00	33.00	33.00
31.00	31.00	31.00	31.00	Fused, imp, 900 lb bbls NY ton	.....	31.00	31.00	31.00
.10½	.10	.10	.10	Fluosilicate, crys, 400 lb bbls wks.....lb.	.10	.10½	.10½	.10
.42	.42	.42	.42	Oxide, USP, light, 100 lb bbls .....lb.	.....	.42	.42	.42
.50	.50	.50	.50	Heavy, 250 lb bbls.....lb.	.....	.50	.50	.50
.....	.....	.....	.....	Peroxide, 100 lb cs.....lb.	.....	1.25	1.25	1.25
.10¼	.09¾	.12½	.09¾	Silicofluoride, bbls.....lb.	.09¾	.10¼	.10¼	.09¾
.25	.23	.23	.23	Stearate, bbls.....lb.	.25	.26	.26	.25
.24	.24	.24	.24	Manganese Borate, 30%, 200 lb bbls.....lb.	.....	.19	.24	.19
.08½	.08	.08	.08	Chloride, 600 lb casks.....lb.	.08	.08½	.08½	.08
.....	.....	.05	.04½	Dioxide, tech (peroxide) drs lb.	.04½	.06	.06	.04½
.50	.35	.....	.....	Ore, powdered or granular				
.03½	.03	.03	.03	75-80%, bbls.....lb.	.03	.03½	.03½	.03
.04½	.04	.04	.04	80-85%, bbls.....lb.	.04	.04½	.04½	.04
.05½	.05	.05	.05	85-88%, bbls.....lb.	.05	.05½	.05½	.05
.07¾	.07	.07	.07	Sulfate, 550 lb drs NY.....lb.	.08	.08½	.08½	.08
Nom.	.03½	.03½	.03½	Mangrove 55%, 400 lb bbls...lb.	.03½	Nom.	Nom.	.03½
45.00	39.000	034.00	0 1 3.	Bark, African.....ton	.....	32.00	35.00	30.00
12.00	10.00	10.00	5 .	Marble Flour, bulk.....ton	14.00	15.00	15.00	14.00
				Mercurous chloride.....lb.	.....	2.05	2.05	2.05
132.00	121.00	129	99.00 .00	Mercury metal.....75 lb flask	125.00	126.00	126.00	120.00
.74	.72	.72	.72	Meta-nitro-aniline.....lb.	.67	.69	.74	.67
1.80	1.50	1.70	1.70	Meta-nitro-para-toluidine 200 lb. bbls.....lb.	1.50	1.55	1.55	1.50
.94	.90	.90	.90	Meta-phenylene-diamine 300 lb. bbls.....lb.	.84	.90	.90	.84
.74	.72	.72	.72	Meta-toluene-diamine, 300 lb bbls.....lb.	.70	.72	.72	.70

Methanol

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
				Methanol, (Wood Alcohol),....				
.58	.46	.80	.55	95%.....gal.	.55	.60	.65	.55
.60	.47	.87	.57	97%.....gal.	.57	.62	.65	.57
.63	.44	.....	.....	Pure,.....gal.	.60	.65	.68	.60
.58	.48	.....	.....	Synthetic, drums c-1.....gal.	.57	.62	.66	.57
.75	.45	.80	.75	Denat. gre. tanks.....gal.	.60	.62	.62	.60
.95	.95	.95	.95	Methyl Acetate, drums.....gal.	.. ..	.95	.95	.95
.90	.68	.88	.75	Acetone, 100 gal drums...gal.	.83	.85	.85	.83
.95	.85	1.00	.85	Anthraquinone, kegs.....lb.	.85	.95	.95	.85
.....	.....	.....	.....	Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.60	.55
60	.55	.55	55	Chloride, 90 lb cyl.....lb.	.55	.60	.....	.....
				Furoate, tech., 50 gal. dr., .lb.	.....	.50	.50	.50
80.00	65.00	.03½	.03½	Mica, dry grd. bags wks.....lb.	65.00	80.00	80.00	65.00
115.00	110.00	.05½	.05½	Wet, ground, bags wks.....lb.	110.00	115.00	115.00	110.00
.....	.....	3.00	3.00	Michler's Ketone, kegs.....lb.	.....	3.00	3.00	3.00
				Monochlorobenzene, drums see, Chorobenzene, mono.....lb.				
.75	.70	.70	.70	Monoethylorthotoluidin, drs. lb.	.70	.75	.75	.70
1.05	1.05	1.05	1.05	Monomethylaniline, 900 lb dr .....lb.	.....	1.05	1.05	1.05
4.20	3.95	3.95	3.95	Monomethylparaminosufate 100 lb drums.....lb.	3.95	4.20	4.20	3.95
.07	.06½	.06½	.06½	Montan Wax, crude, bags....lb.	.06½	.07	.07	.06½
.04½	.04½	.04	.04	Myrobalans 25%, liq bbls....b	.04½	.04½	.04½	.04½
.08½	.08	.08	.08	50% Solid, 50 lb boxes.....lb.	.08	.08½	.08½	.08
50.00	42.00	43.50	41.00	J1 bags.....ton	.....	41.00	43.00	40.00
40.00	32.50	37.00	23.50	J 2 bags.....ton	.....	29.00	40.00	29.00
40.00	32.50	37.00	30.00	R 2 bags.....ton	.....	29.00	34.00	29.00
.18	.18	.21	.18	Naphtha, v. m. & p. (deodorized) bbls.....gal.	.....	.16	.18	.16
.06	.05½	.06	.05½	Naphthalene balls, 250 lb bbls wks.....lb.	.....	.05½	.05½	.05½
.04½	.04½	.04½	.04½	Crushed, chipped bgs wks..lb.	.....	.04½	.04½	.04½
.05	.05	.05	.04½	Flakes, 175 lb bbls wks....lb.	.....	.05	.05	.05
.24	.21	.21	.21	Nickel Chloride, bbls kegs....lb.	.21	.24	.24	.21
.38	.35	.35	.35	Oxide, 100 lb kegs NY.....lb.	.37	.40	.40	.37
.09¾	.09	.09	.08½	Salt bbl. 400 bbls lb NY...lb.	.....	.13	.13	.13
.09	.08¾	.08¾	.08	Single, 400 lb bbls NY.....lb.	.....	.13	.13	.13
1.30	1.25	1.25	1.10	Nicotine, free 40%, 8 lb tins, cases.....lb.	1.25	1.30	1.30	1.25
1.20	.98½	1.10	1.10	Sulfate, 10 lb tins.....lb.	.98½	1.20	1.20	.98½
14.00	13.00	13.00	13.00	Nitre Cake, bulk.....ton	16.00	18.00	18.00	12.00
.10½	.10¼	10¼	.09¼	Nitrobenzene, redistilled, 1000 lb drs wks.....lb.	.10¼	.10½	.10½	.10¼
Nom.	.40	.40	.40	Nitrocellulose, regular drums wks.....lb.	.40	Nom.	Nom.	.40
				Low viscosity (soln only)				
Nom.	.55	.55	.55	Grade 1 drums, wks.....lb.	.55	Nom.	Nom.	.55
Nom.	.50	.50	.50	Grade 2 drums, wks.....lb.	.50	Nom.	Nom.	.50
4.00	3.35	3.60	3.35	Nitrogenous Material, bulk..unit	.....	3.55	4.00	3.55
.25	.25	.25	.25	Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.25	.25
.15	.14	.14	.14	Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.15	.14
Nom.	.25	.25	.25	Nutgalls Aleppy, bags.....lb.	.16	.16½	.16½	.16
.18	.17	.17	.17	Chinese, bags.....lb.	.12	.13	.13	.12
.24	.22	.22	.22	Powdered, bags.....lb.	.22	.24	.24	.22
.03½	.03½	.03½	.03½	Oak, tanks, wks.....lb.	.....	.03½	.03½	.03½
.04½	.04	.04	.04	23-25% liq., 600 lb bbl wk lb.	.04	.04½	.04½	.04
50.00	45.00	45.00	45.00	Oak Bark, ground.....ton	30.00	35.00	50.00	30.00
23.00	20.00	20.00	20.00	Whole.....ton	20.00	23.00	23.00	20.00
.13½	.13	.14½	.13	Orange-Mineral, 1100 lb casks NY.....lb.	.12½	.13½	.13½	.12½
2.25	2.20	2.20	2.20	Orthoaminophenol, 50 lb kgs..lb.	2.20	2.25	2.25	2.20
2.50	2.35	2.50	2.35	Orthoanisidine, 100 lb drs....lb.	2.50	2.60	2.60	2.50
.65	.50	.50	.50	Orthochlorophenol, drums....lb.	.50	.65	.65	.50
.28	.18	.18	.18	Orthocresol, drums.....lb.	.18	.28	.28	.18
.07	.06	.06	.06	Orthodichlorobenzene, 1000 lb drums.....lb.	.07	.10	.10	.07
.35	.32	.32	.32	Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	30	.33	.33	.30

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consumption from this source continues to expand there does not appear any likelihood of any alleviation of the situation in the near future; but we understand that the home makers of phenol have no intention at present of putting up prices, although they must have consideration for the probable import of synthetic carbolic acid crystals produced from benzol on the Continent. This is hardly a commercial proposition at the moment, but what the future holds out in this direction is an unknown quantity.

Phosphate Rock — Exports of phosphate rock from the United States during the first half of 1929 reached 542,700 tons, valued at $2,569,800. This commodity has been shipped to foreign countries for a great many years and, despite competition from the African phosphates during the past ten years, has been able for the most part to hold its own in foreign markets. Phosphate rock has had the unique distinction of a lower price the past two or three years than at the beginning of the century.

Potash Caustic — Although foreign producers lowered prices on this material, they have as yet made no revision on prices of the raw material. This leaves domestic producers in an awkward position, as production costs leave them no margin to cut prices to meet that of foreign producers.

Rosin — Easier conditions which have developed in the Southern markets have been reflected here in lower prices and easy conditions during the past month. Demand is reported as being fairly good with stocks somewhat smaller. Exports of gum and wood rosin combined for first six months of 1929 totalled 678,871 barrels, valued at $9,768,728, as against 543,539 barrels, valued at $8,134,688 for first half of 1928.

Shellac — Has been slightly easier during the past month and prices are a bit lower. It is pointed out that the shellac market which in previous years has fluctuated widely, has thus far this year varied but a few cents in price. In no recent year has it been so steady over such a long period. Most factors look for higher prices if the expected demand developes during this and next month. Advices from Calcutta state that during the month of August a large amount of business has been done with importers in the United States and customers in all lines of trade have been ordering out against their contracts right along in a very satisfactory manner, all of which would indicate that business as a whole will continue to be very good. During the seven months period of this year varnish

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.18	.17	.13	.13	Orthonitrotoluene, 1000 lb drs wk....lb.	.17	.18	.18	.17
.90	.85	.85	.85	Orthonitrophenol, 350 lb dr...lb.	.85	.90	.90	.85
.31	.29	.29	.25	Orthotoluidine, 350 lb bbl 1c-1 lb.	.25	30	.30	.25
.75	.70	.70	.70	Orthonitroparachlorphenol, tins....lb.	.70	.75	.75	.70
.17	.16	.16	.16	Osage Orange, crystals....lb.	.16	.17	.17	.16
.07	.07	.07	.07	51 deg. liquid....lb.	.07	.07½	.07½	.07
.15	.14½	.14½	.14½	Powdered, 100 lb bags....lb.	.14½	.15	.15	.14½
				Paraffin, refd, 200 lb cs slabs				
.06¾	.06¼	.06¼	.06¼	123-127 deg. M. P....lb.	.06	.06¼	.06¾	.06¼
.07¾	.07½	.07½	.07½	128-132 deg. M. P....lb.	.06½	.06¾	.07	.06½
.08¼	.08	.08	.08	133-137 deg. M. P....lb	.07½	.07¾	.07¾	.07½
.10	.08¾	.08¾	.08¾	138-140 deg. M. P....lb.	.08	.09	.09	.08
.28	.20½	.29	.26	Para Aldehyde, 110-55 gal drs..lb.	.20½	.23	.28	.20½
1.05	1.00	1.00	1.00	Aminoacetanilid, 100 lb bg..lb.	1.00	1.05	1.05	1.00
1.30	1.25	1.25	1.25	Aminohydrochloride, 100 lb kegs....lb.	1.25	1.30	1.30	1.25
1.15	1.15	1.15	1.15	Aminophenol, 100 lb kegs..lb.	.99	1.02	1.15	.99
.65	.50	.50	.50	Chlorophenol, drums....lb.	.50	.65	.65	.50
.....	.....	.12	.12	Coumarone, 330 lb drums..lb.	.....	.....	.....	.....
2.50	2.25	2.25	2.25	Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.50	2.25
.20	.17	.17	.17	Dichlorobenzene, 150 lb bbls wks....lb.	.17	.20	.20	.17
.55	.50	.53	.50	Nitroacetanilid, 300 lb bbls.lb.	.50	.55	.55	.50
.59	.48	.52	.52	Nitroaniline, 300 lb bbls wks....lb.	.48	.59	.49	.48
.32	.32	.32	.32	Nitrochlorobenzene, 1200 lb drs wks....lb.	.23	.26	.26	23
2.85	2.75	2.75	2.75	Nitro-orthotoluidine, 300 lb bbls....lb.	2.75	2.85	2.85	2.75
.55	.50	.50	.50	Nitrophenol 185 lb bbls....lb.	.50	.55	.55	.50
.94	.92	.92	.92	Nitrosodimethylaniline, 120 lb. bbls....lb.	.92	.94	.94	.92
.30	.30	.30	.25	Nitrotoluene, 350 lb bbls....lb.	.30	.31	.31	.30
1.20	1.15	1.20	1.15	Phenylenediamine, 350 lb bbls....lb.	1.15	1.20	1.20	1.15
.41	.40	.40	.40	Tolueneulfonamide, 175 lb bbls....lb.	.70	.75	.75	.70
.22	.20	.20	.18	Toluenesulfonchloride, 410 lb bbls wks....lb.	.20	.22	.22	.20
.42	.40	.45	.38	Toluidine, 350 lb bbls wk...lb.	.40	.42	.42	.40
				Paris Green, Arsenic Basis				
.25	.20	.21	.21	100 lb kegs....lb.	.....	.27	.27	.25
.23	.17	.19	.19	250 lb kegs....lb.	.....	.25	.25	.23
.....	.....	.25	.25	Persian Berry Ext., bbls....lb.	.25	Nom.	.25	.25
.03	.02½	.02½	.02½	Petrolatum, Green, 300 lb bbl.lb.	.02	.02½	.02½	.02
.13	.20	.18	.16	Phenol, 250-100 lb drums....lb.	.14¾	.15	.16	.13
1.35	1.35	1.35	1.28	Phenyl - Alpha - Naphthylamine, 100 lb kegs....lb.	.....	1.35	1.35	1.35
				Phosphate				
				Phosphate Acid (see Superphosphate)				
				Phosphate Rock, f.o.b. mines				
3.15	3.00	3.00	3.00	Florida Pebble, 68% basis..ton	3.00	3.15	3.15	3.00
3.65	3.50	3.50	3.50	70% basis....ton	3.75	4.00	4.00	3.50
4.15	4.00	4.00	3.85	72% basis....ton	4.25	4.50	4.50	4.00
5.00	5.00	5.35	5.00	75-74% basis....ton	5.25	5.50	5.50	5.00
5.75	5.75	5.75	5.60	75% basis....ton	.....	5.75	5.75	5.75
6.25	6.25	6.25	6.00	77-76% basis....ton	.....	6.25	6.25	6.25
5.00	5.00	5.50	5.00	Tennessee, 72% basis....ton	.....	5.00	5.00	5.00
.40	.35	.35	.35	Phosphorous Oxychloride 175 lb cyl....lb.	.35	.40	.40	.35
.65	.60	.65	.60	Red, 110 lb cases....lb.	.55	.60	.60	.55
.32	.32	.32	.32	Yellow, 110 lb cases wks..lb.	.....	.32	.32	.32
.46	.46	.46	.46	Sesquisulfide, 100 lb cs....lb.	.....	.44	.46	.44
.....	.....	.35	.35	Trichloride, cylinders....lb.	.....	.35	.35	.35
.20	.18	.18	.18	Phthalic Anhydride, 100 lb bbls wks....lb.	.18	.20	.20	.18
45.00	37.00	40.00	37.00	Pigments Metallic, Red or brown bags, bbls, Pa. wks....ton	37.00	45.00	45.00	37.00
				Pine Oil, 55 gal drums or bbls				
.64	.63	.63	.63	Destructive dist....lb.	.63	.64	.64	.63
10.60	8.00	8.00	8.00	Prime bbls....bbl.	8.00	10.60	10.60	8.00
.70	.70	.70	.66	Steam dist. bbls....gal.	.65	.70	.70	.65
45.00	40.00	40.00	40.00	Pitch Hardwood,.... wks....ton	40.00	45.00	45.00	40.00
3.30	3.30	3.30	3.30	Plaster Paris, tech, 250 lb bbls....bbl.	3.30	3.50	3.50	3.30
				Potash				
.07¼	.07¼	.07¼	.07¼	Potash, Caustic, wks, solid...lb.	.06¾	.06⅞	.07¼	.06¾
.07½	.07½	.07½	.07½	flake....lb.	.0705	.08	.07½	.0705
				Potash Salts, Rough Kainit				
9.00	9.00	9.00	9.00	12.4% basis bulk....ton	.....	9.10	9.10	9.00
9.50	9.50	9.50	9.50	14% basis....ton	.....	9.60	9.60	9.50
				Manure Salts....				
12.40	12.40	12.40	12.40	20% basis bulk....ton	.....	12.50	12.50	12.40
18.75	18.75	18.75	18.75	30% basis bulk....ton	.....	18.95	18.95	18.75
36.40	36.40	36.40	36.40	Potassium Muriate, 80% basis bags....ton	.....	36.75	36.75	36.40
27.00	27.00	27.00	27.00	Pot. & Mag. Sulfate, 48% basis bags....ton	.....	27.50	27.50	27.00
47.30	47.30	47.30	47.30	Potassium Sulfate, 90% basis bags....ton	.....	47.75	47.75	47.30
.09½	.09	.09	.09	Potassium Bicarbonate, USP, 320 lb bbls....lb.	.13	.14	.14	.13
.09¼	.08½	.08½	.08	Bichromate Crystals, 725 lb casks....lb.	.09	.09¼	.09¼	.09
.12¾	.12	.12	.11	Powd., 725 lb cks wks....lb.	.13	.13¼	.13¼	.13

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gums imported into the United States advanced to 62,631,183 pounds, valued at $13,079,791 in comparison with 48,277,928 pounds, having a value of $9,896,476 for the same months of 1928. Notable increases were evidenced in receipts of demar and shallac. Separate figures indicating quantities and values for the periods of 1928 and 1929 were:

	7 Mos. 1928	*7 Mos. 1929*
	Pounds	*Pounds*
Damar	8,559,746	11,700,709
Kauri	3,004,446	2,753,016
Lac, crude, seed, button and stick		4,700,327
Shellac	13,204,592	20,713,731
All other gums	23,509,144	22,763,400

Soda Ash — In both this and caustic, there has been no change from the intense consuming activity which has characterized the entire year. Business has exceeded slightly that of September of last year, and all await the opening of the contract season within the next month.

Sodium Nitrate — Business has been rather quiet and slow thus far but the turn of the month is expected to increase activity. Prices advance with the first of the month according to schedule, and as of August 31, the total visible supply was reported as 2,026,000 tons as compared with 1,495,000 tons last year.

Sodium Nitrite — Demand continues very good and slightly ahead of last year.

Sodium Phosphate — Imports of sodium phosphate into the United States which have risen steadily since 1923, continued upward during the first half of 1929. Less than 900 tons were imported during 1923; in 1928 European manufacturers sold over 9,800 tons in the United States. During the first half of 1929 the quantity imported for consumption reached 5,029 tons, as compared with 4,162 in the corresponding period of 1928. The official import statistics do not show separately the different types of sodium phosphates imported. It is understood that the bulk of the imports comprise dibasic. Domestic production is chiefly of tribasic salt, while dibasic and monobasic are of minor importance. The latest production statistics covering operations during 1927 placed the domestic output at 75,000 tons, more than double that of 1923.

Sodium Sulfide — It is reported that continued low prices have caused a curtailment of production and as a result of this, together with increased demand, a scarcity seems quite likely to ensue, bringing a stronger tone to the entire market before the end of the year.

Sodium Silicate — Exports during the first half of the year show a gain of about 8,000,000 pounds over the same period of 1928. Exports during that

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.17	.16	.16	.16	Binoxiate, 300 lb bbls......lb.	.16	.17	.17	.16
.30	.30	.30	.30	Bisulfate, 100 lb kegs......lb.	.....	.30	.30	.30
.05¾	.05⅝	.05⅝	.05⅝	Carbonate, 80-85% calc. 800 lb casks..............lb.	.05⅝	.05¾	.05¾	.05⅝
.09	.06½	.08½	.08½	Chlorate crystals, powder 112 lb keg wks...........lb.	.08½	.09	.09	.03½
.08½	.07¼	.08¾	.08½	Imported 112 lb kegs NY.............lb...	.07½	.07¾	.07¾	.07½
.05½	.05⅝	.05⅝	.05⅝	Chloride, crys bbls.........lb.	.05⅝	.05½	.05½	.05⅝
.28	.27	.27	.27	Chromate, kegs...........lb.	.27	.28	.28	.27
.57½	.55	.55	.55	Cyanide, 110 lb. cases.....lb.	.55	.57½	.57½	.55
.12	.11½	.11½	.11½	Metabisulfite, 300 lb. bbl...lb.	.12	.13	.13	.11½
.17	.16	.16	.16	Oxalate, bbls.............lb.	.20	.24	.24	.16
.12	.11	.11	.11	Perchlorate, casks wks.....lb.	.11	.12	.12	.11
.15½	.15	15½	.14¾	Permanganate, USP, crys 500 & 100 lb drs wks........lb.	.16	.16½	.16½	.16
.38	.37	.39	.37½	Prussiate, red, 112 lb keg...lb.	.38	.40	.40	.38
.18½	.18	.18	.18	Yellow, 500 lb casks.....lb.	.18½	.21	.21	.18½
.51	.51	.51	.51	Tartrate Neut, 100 lb keg..lb.	.....	.21	.51	.51
.25	.25	.25	.25	Titanium Oxalate, 200 lb bbls ....lb.	.21	.23	.25	.21
.....	.....	.....	.. ..	Propyl Furoate, 1 lb tins.....lb.	.....	5.00	5.00	5.00
.05	.04	.04	.04	Pumice Stone, lump bags.....lb.	.04	.05	.05	.04
.06	.04½	.04½	.04½	250 lb bbls.............lb.	.04½	.06	.06	.04½
.03	.02½	02½	.02½	Powdered, 350 lb bags.....lb.	.02½	.03	.03	.02½
.03½	.03½	3.75	3 75	Putty, commercial, tubs..100 lb.	.....	.03½	.03½	.03½
.0	.05½	5.50	5.50	Linseed Oil, kegs......100 lb.	.....	.05½	.05½	.05½
1.5	1.50	3.00	1.50	Pyridine, 50 gal drums......gal.	.....	1.75	1.75	1.50
.1	.13	.13	.12	Pyrites, Spanish cif Atlantic ports bulk.............unit	.13	.13½	.13½	.13
.04	.03	.03	.03	Quebracho, 35% liquid tks....lb.	.03½	.04	.04	.03½
.04	.03½	.03½	.03½	450 lb bbls c-1..........lb.	.03¾	.04¼	.04¼	.03¾
.05	.04	.04	.04	35% Bleaching, 450 lb bbl .lb.	.04¼	.05¼	.04¼	.05¼
.05	.05	.05	.04¾	Solid, 63%, 100 lb bales cif..lb.	.05	.05½	.05¾	.05¼
.05	.05	.05	.05	Clarified, 64%, bales.....lb.	.....	.5⅝	.05⅝	.05⅝
.06	.05½	.06½	.06½	Quercitron, 51 deg liquid 450 lb bbls..................lb.	.05½	.06	.06	.05½
.13	.10	.10	.10	Solid, 100 lb boxes.........lb.	.10	.13	.13	.10
14.00	14.00	14.00	14.00	Bark, Rough...........ton	.....	14.00	14.00	14.00
35.00	34.00	34.00	34.00	Ground................ton	34.00	35.00	35.00	34.00
.46	.45	.45	.45	R Salt, 250 lb bbls wks......lb.	.45	.46	.46	.45
.....	.....	.18	.18	Red Sanders Wood, grd bbls..lb.	.....	.18	.18	.18
1.35	1.25	1.25	1.25	Resorcinol Tech, cans........lb.	1.15	1.25	1.25	1.15
.57	.57	.67	.57	Rosin Oil, 50 gal bbls, first run ....gal.	.....	.62	.62	.57
.62	.62	.72	.62	Second run............gal.	.....	.64	.?4	.62
				Rosin				
				Rosins 600 lb bbls 280 lb...unit				
9.75	8.20	13.00	8.50	B........................	.....	9.17	9.17	7.45
9.80	8.25	13.00	8.50	D........................	.....	9.17	9.17	7.70
9.95	8.60	13.15	8.50	E........................	.....	9.17	9.17	8.30
10.10	8.65	13.20	8.50	F........................	.....	9.20	9.30	8.40
10.10	8.75	13.25	8.50	G........................	.....	9.20	9.45	8.40
10.10	8.75	13.30	8.50	H........................	.....	9.20	9.50	8.40
10.15	8.80	13.35	8.55	I........................	.....	9.20	9.50	8.40
10.15	8.85	14.80	8.65	K........................	.....	9.25	9.55	8.45
10.30	8.85	15.00	8.80	M........................	.....	9.25	9.85	8.50
11.00	9.15	15.85	9.15	N........................	.....	9.30	10.30	8.93
11.65	10.15	16.60	10.50	WG.......................	.....	9.35	11.30	9.00
12.65	10.40	18.55	12.00	WW.......................	.....	9.55	12.30	9.30
30.00	24.00	24.00	24.00	Rotten Stone, bags mines....ton	24.00	30.00	30.00	24.00
.08	.07	.07	.07	Lump, imported, bbls......lb.	.07	.08	.08	.07
.12	.09	.09	.09	Selected bbls............lb.	.09	.12	.12	.09
.05	.02	.02	.02	Powdered, bbls...........lb.	.02	.05	.05	.02
.05	.04½	.04½	.04½	Sago Flour, 150 lb bags......lb.	.04½	.05	.05	.04½
.....	.....	.90	.90	Sal Soda, bbls wks.......100 lb.	.....	1.00	1.00	1.00
20.00	19.00	19.00	19.00	Salt Cake, 94-96% c-1 wks. .ton	19.00	21.00	21.00	19.00
17.00	15.00	15.00	15.00	Chrome ....ton	12.00	15.00	17.00	12.00
.06¾	.06⅛	.06⅛	.06⅛	Saltpetre, double refd granular 450-500 lb bbls.........lb.	.06⅛	.06¾	.06¾	.06⅛
.01½	.01½	.01½	.01½	Satin, White, 500 lb bbls.....lb	.....	.01½	.01½	.01½
.62½	.49	.66	.47	Shellac Bone dry bbls........lb.	.....	.56	.61	.55
.55	.45	.57	.41	Garnet, bags..............lb.	.. ..	.45	.45	.43
.58	.47	.65	40	Superfine, bags............lb.	.46	.47	.47	.45
.55	.42	.37	.57	T. N. bags................lb.	.....	.43	.44	.41
.57	.53	.50	.50	Schaeffer's Salt, kegs.........lb.	.53	57	.57	.53
11 00	8.00	6.00	6.00	Silica, Crude, bulk mines....ton	8.00	11.00	11.00	8.00
30.00	22.00	15.00	15.00	Refined, floated bags......ton	22.00	30.00	30.00	22.00
.....	.....	32.00	32.00	Air floated bags.........ton	.....	32.00	32.00	32.00
40.00	32.00	55.00	55.00	Extra floated bags......ton	32.00	40.00	40.00	32.00
22.00	15.00	15.00	15.00	Soapstone, Powdered, bags f. o. b. mines.................ton	15.00	22.00	22.00	15.00
				Soda				
1.40	1.40	1.32½	1.32½	Soda Ash, 58% dense, bags c-1 wks................100 lb.	.....	1.40	1.40	1.40
2.29	2.40	2.14	2.04	58% light, bags.......100 lb.	.....	1.34½	1.34½	1.34½
1.32½	1.32½	1.32½	1.32½	Contract, bags c-1 wks.100 lb.	.....	1.32	1.32	1.32
4.21	4.16	4.16	4.06	Soda Caustic, 76% grnd & flake drums..............100 lb.	.....	3.35	3.35	3.35
3.91	3.76	3.76	3.66	76% solid drs.........100 lb.	.....	2.95	2.95	2.95
3.00	3.00	3.00	3.00	Contract, c-1 wks......100 lb.	.....	2.90	2.90	2.90
.05	.04½	.04½	.04½	Sodium Acetate, tech....450 lb. bbls wks...............lb.	.05¾	.06	.06¾	.05
.....	.....	.19	.18	Arsenate, drums..........lb.	.18	.19	.19	.18
.....	.....	1.00	1.00	Arsenite, drums..........gal.	1.00	1.50	1.50	1.00
2.41	2.41	2.41	2.41	Bicarb, 400 lb bbl NY..100 lb.	.....	2.41	2.41	2.41

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Sept. 1929 $1.041

period totaled 16,844 tons, while imports have disappeared entirely.

Sodium Silicofluoride — Imports increased during the first half of the present year as compared with the same period of last year, the total aggregate of 1,160 tons, amounting to 65 per cent of the total for the previous 12 months.

Turpentine — Demand has been somewhat smaller than expected, but stocks are lower than at the same time last year. July exports of naval stores stood well ahead of those for the same month last year, according to the report of the United States Department of Commerce. These attained a value of $3,476,489 this year, against $2,853,366 in 1928, a net gain of approximately $623,000. July also stood ahead of June by about $200,000. Only one item displayed a decrease when compared with July, 1928. That was wood turpentine, which has shown a consistent falling off in export demand the entire year. Values for this and last year when contrasted reveal a net decline of $7,000, amounting to $29,350 and $36,378, respectively. On the other hand gum spirit exports rose from $1,630,737 gallons, worth $825,535, to 2,165,050 gallons, valued at $1,126,217. Gum rosin shipments to foreign countries totaled 140,504 barrels this year and 109,324 barrels last, with respective values of $1,943,300 and $1,675,054. Wood rosin displayed an increase in export value of about $19,000. For the first seven months of 1929 the total exports of naval stores were worth $17,600,811, against $14,709,731 in 1928 the same period. Once again the only loser on the list was wood turpentine, the export value of which disclosed a falling off of about $4,000,000.

OILS AND FATS

Chinawood Oil — Has assumed a very strong position during the past month so that prices on tanks at the Coast are now 1¼c lb. higher than when last reported. This is largely due to the fact that all of the oils in the linseed oil category are in very favorable position due to unfavorable market reports and high prevailing prices of the latter oil. Total tung oil exports from Hankow during August amounted to 17,885,040 pounds, of which amount, 14,488,000 pounds went to the United States and 3,407,040 pounds to Europe. The estimated unsold stocks of oil at Hankow at the end of August were approximately 3,200 short tons. A marked increase occurred in the total tung oil

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
.07	.06½	.06½	.06½	Bichromate, 500 lb cks wks. lb.	.07½	.07¾	.07¾	.07½
.04	.04	.08½	.08½	Bisulfite, 500 lb bbl wks....lb.	.....	.04	.04	.04
1.35	1.30	1.30	1.30	Carb. 350 lb bbls NY..100 lb.	1.30	1.35	1.35	1.30
.06¾	.05¾	.06½	.06½	Chlorate, ... wks..lb.	.10	.11	.11	.06½
13.00	12.00	12.00	12.00	Chloride, technical........ton	12.00	13.00	13.00	12.00
.20	.20	.20	.20	Cyanide, 96-98%, 100 & 250 lb drums wks..........lb.	.18	.20	.20	.18
.09	.08¾	.08¾	.08¾	Fluoride, 300 lb bbls wks...lb.	.08¾	.09	.09	.08¾
.24	.22	.22	.22	Hydrosulfite, 200 lb bbls f. o. b. wks.................lb.	.22	.24	.24	.22
.05	.05	.05	.05	Hypochloride solution, 100 lb cbys.................lb.	.....	.05	.05	.05
3.05	2.65	2.65	2.65	Hyposulfite, tech, pea cyrs 375 lb bbls wks......100 lb.	2.65	3.05	3.05	2.65
2.65	2.40	2.40	2.40	Technical, regular crystals 375 lb bbls wks....100 lb.	2.40	2.65	2.65	2.40
.45	.45	.70	.45	Metanilate, 150 lb bbls.... lb.	.....	.45	.45	.45
.....	.....	.02½	.02½	Monohydrate, bbls........lb.	.....	.02½	.02½	.02½
.57	.55	.55	.55	Naphthionate, 300 lb bbl...lb.	.55	.57	.57	.55
2.45	2.12½	2.67	2.25	Nitrate, 92%, crude, 200 lb bags c-1 NY......100 lb.	2.11	2.12½	2.22½	2.09
.08½	.07½	.08½	.08	Nitrite, 500 lb bbls spot....lb.	.07½	.08	.08	.07½
.27	.25	.25	.25	Orthochlorotoluene, sulfonate, 175 lb bbls wks.......lb.	.25	.27	.27	.25
.23	.20	.20	.20	Oxalate Neut, 100 lb kegs..lb.	.37	.42	.42	.37
3.90	3.90	3.90	3.90	Paratoluene, tri-sodium, tech. 100 lb bbls c-1....100 lb.	.....	3.90	3.90	3.90
.09	.08	.08	.08	Sulfonate, 175 lb bbls....lb	.08	.09	.09	.08
.22	.21	.21	.21	Perborate, 275 lb bbls.....lb.	.18	.20	.22	.18
3.55	3.25	3.25	3.25	Phosphate. di-sodium, tech. 310 lb bbls.......100 lb.	3.25	3.55	3.55	3.25
.....	....	.....	.....	tri-sodium, tech, 325 lb bbls................100 lb.	3.90	4.00	4.00	3.90
.72	.69	.69	.69	Picramate, 100 lb kegs.....lb.	.69	.72	.72	.69
.12½	.12	.12	.11	Prussiate, Yellow, 350 lb bbl wks................lb.	.12	.12½	.12½	.12
.14	.13½	.13½	.13½	Pyrophosphate, 100 lb keg..lb.	.15	.20	.20	.15
1.45	1.20	1.20	1.20	Silicate, 60 deg 55 gal drs, wks ....100 lb.	.....	1.65	1.65	1.65
1.10	.85	.85	.85	40 deg 55 gal drs, wks ....100 lb.	.70	.80	.80	.70
.05	.05	.04½	.04½	Silicofluoride, 450 lb bbls NY ....lb.	.05½	.05½	.05½	.05
.49	.48½	.48½	.48½	Stannate, 100 lb drums....lb.	.41½	.42	.43	.41½
.29	.18	.20	.20	Stearate, bbls.............lb.	.25	29	.29	.25
.18	.16	.16	.16	Sulfanilate, 400 lb bbls.....lb.	.16	.18	.18	.16
.02¾	.02½	.02½	.02¼	Sulfate Anhyd, 550 lb bbls c-1 wks..............lb.	.02½	.02¾	.02¾	.02½
.02¾	.02½	.02½	.02¼	Sulfide, 30% crystals, 440 lb bbls wks.............lb.	.02½	.02¾	.02¾	.02½
.04	.03½	.03½	03½	62% solid, 650 lb drums 1c-1 wks............lb	.03½	.04	.04	.03½
.03½	.03½	.03½	.03½	Sulfite, crystals, 400 lb bbls wks..................lb.	.03½	.03½	.03½	.03½
.50	.40	.40	.40	Sulfocyanide, bbls.........lb.	.28	.35	.76	.28
.85	.80	.85	.80	Tungstate, tech, crystals, kegs ....lb.	.....	.88	1.40	.88
.40	.35	.40	.35	Solvent Naphtha, 110 gal drs wks.................gal.	.35	.40	.40	.35
.01¾	.01¾	.01¾	.01¾	Spruce, 25% liquid, bbls.....lb.	.....	.01¾	.01¾	.01¾
.01	.01	.01	.01	25% liquid, tanks wks.....lb.	.....	.01	.01	.01
.02½	.02	.02	.02	50% powd, 100 lb bag wks lb.	.02	.02½	.02½	.02
4.42	3.07	3.22	3.07	Starch, powd., 140 lb bags ....100 lb.	3.92	4.12	4.12	3.82
4.32	2.97	3.12	2.97	Pearl, 140 lb bags.....100 lb.	3.82	4.02	4.02	3.72
.06¾	.05¾	.06	.04¾	Potato, 200 lb bags.........lb.	.05¾	.06½	.06¾	.05¾
.06¾	.05¾	.06½	.06½	Imported bags..........lb.	.05¾	.06½	.06¾	.05¾
.08½	.08	.08	.06	Soluble.................lb.	.08	.08½	.08½	08
.10	.09½	.09½	.09	Rice, 200 lb bbls..........lb.	.09½	.10	.10	.09½
.07	.06½	.06½	.06½	Wheat, thick bags.........lb.	.06½	.07	.07	.06½
.10	.09½	.09½	.09½	Thin bags..............lb.	.09½	.10	.10	.09½
.07½	.07½	.07½	.07½	Strontium carbonate, 600 lb bbls wks....................lb.	.07½	.07½	.07½	.07½
.09	.08¾	.08¾	.08	Nitrate, 600 lb bbls NY....lb.	.09	.09½	.09½	.08¾
.....	.....	.....	.....	Peroxide, 100 lb drs.......lb.	.....	1.25	1.25	1.25
				Sulfur				
2.05	2.05	2.05	2.05	Sulfur Brimstone, broken rock, 250 lb bag c-1.......100 lb.	.....	2.05	2.05	2.05
19.00	18.00	18.00	18.00	Crude, f. o. b. mines......ton	18.00	19.00	19.00	18.00
2.40	2.40	2.40	2.40	Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb.	.....	2.40	2.40	2.40
2.50	2.50	2.50	2.50	Heavy bags c-1......100 lb.	.....	2.50	2.50	2.50
3.45	3.45	3.45	3 45	Flowers, 100%, 155 lb bbls c-1 NY..............100 lb.	.....	3.45	3.45	3.45
2.85	2.65	2.65	2.65	Roll, bbls 1c-1 NY.....100 lb.	2.65	2.85	2.85	2.65
.05½	.05	.05	.05	Sulfur Chloride, red, 700 lb drs wks..................lb.	.05	.05½	.05½	.05
.04½	.03½	.03¾	.03½	Yellow, 700 lb drs wks.....lb.	.03½	.04½	.04½	.03½
.08½	.08	.08	.08	Sulfur Dioxide, 150 lb cyl....lb.	.08	.08½	.08½	.08
.19	.17	.17	.17	Extra, dry, 100 lb cyl......lb.	.17	.19	.19	.17
.65	.10	.65	.65	Sulfuryl Chloride, 600 lb dr...lb.	.10	.65	.65	.10
.11½	.11	.11	.11	Stainless, 600 lb bbls....lb.	.11	.11½	.11½	.11
.06	.05½	.05	.05	Extract, 450 lb bbls.......lb.	.05½	.06	.06	.05½
130.00	130.00	130.00	130.00	Sicily Leaves, 100 lb bg...ton	.....	130.00	130.00	130.00
72.00	72.00	80.00	72.00	Ground shipment.......ton	.....	72.00	72.00	72.00
60.00	55.00	55.00	55.00	Virginia, 150 lb bags......ton	55.00	60.00	60.00	55.00
15.00	12.00	12.00	12.00	Talc, Crude, 100 lb bgs NY...ton	12.00	15.00	15.00	12.00
18.00	16.00	16.00	16.00	Refined, 100 lb bgs NY..ton	16.00	18.00	18.00	16.00
35.00	30.00	30.00	30.00	French, 220 lb bags NY...ton	20.00	25.00	25.00	20.00
45.00	38.00	38.00	38.00	Refined, white, bags....ton	38.00	45.00	45.00	38.00
50.00	40.00	40.00	40.00	Italian, 220 lb bags NY...ton	40.00	50.00	50.00	40.00
55.00	50.00	50.00	50.00	Refined, white, bags....ton	50.00	55.00	55.00	50.00
				Superphosphate, 16% bulk, wks.....................ton	.....	9.50	10.00	9.00

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Sept. 1929 $1.041

shipments from Hankow during August as compared with the preceding month when they totaled 11,700,320 pounds, of which amount, 10,616,160 pounds went to the United States. Total shipments and shipments to the United States for the first eight months of the present year are also ahead of shipments for the corresponding period of last year. January-August shipments during 1929 totaled 90,890,835 pounds of which amount, 79,301,625 pounds went to the United States. These figures compare with 83,857,235 pounds, of which 68,037,970 pounds went to the United States, during the similar period of 1928. Tung oil imported from China during July reached a total of 14,282,385 pounds, having a value of $1,784,890, which is higher than for the same month last year when the quantity was 10,112,363 pounds, valued at $1,189,255. The respective amounts for the first seven months of 1928 and 1929 were 57,541,782 and 67,730,154 pounds.

Coconut Oil — During the past month the market has been steady but inactive. There has been but little business transacted and both buyers and sellers seem content to await developments. Prices have varied but little and remain at about the same level as when last quoted.

Corn Oil — Conditions in the grain market have lead to considerably higher prices on this oil despite the fact that cottonseed has continued at about the same level. Crude oil in tanks is now ⅝c lb. higher than when last quoted, which is the highest point reached during the past two years.

Cottonseed Oil — Has been quiet and steady during the past month and prices have remained about at the same level as reported a month ago. Bureau of the Census reports 3,353,038 bales of cotton, counting round bales as halves and excluding linters, ginned from the crop of 1929 prior to September 16, against ginnings to September 16 in 1928, of 2,500,781 and in 1927 of 3,504,995 bales.

Linseed Oil — Has advanced about 3c lb. in price during the past month to a new high record, in the face of continued adverse crop reports. The tank price is now at 15c lb., with other prices accordingly higher. Chinawood, perilla, and soy bean are all accompanying linseed oil in its upward flight. Supplies of flaxseed for the 1929-30 season will probably be below that of last year unless present conditions improve in the chief producing countries, according to information received by the Bureau of Agricultural Economics of the Department of Agriculture. Commercial stocks in the United States and Canada at the beginning of the new season on

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
5.10&10	4.65&10	4.85	4.00	Tankage Ground NY.......unit	.....	4.35&10	4.35&10	4.00&10
4.80&10	3.90&10	5.25	3.75	High grade f.o.b. Chicago.unit	..... 3.75&10	4.80&10	3.75&10
5.00&10	4.60&10	5.25	4.00	South American cif.......unit	..... 4.50&10	4.80&10	4.50&10
.05	.04½	.04½	.04½	Tapioca Flour, high grade bgs.lb.	.04½ .05	.05	.04½
.04	.03¾	.03¾	.03½	Medium grade, bags.....lb.	.03¾ .04	.04	.03¾
.27	.26	.26	.26	Tar Acid Oil, 15%,drums....gal.	.26 .27	.27	.26
.30	.29	.29	.29	25% drums............gal.	.29 .30	.30	.29
.08	.07	.07	.07	Coke Oven, tanks wks.....lb.	.07 .08	.08	.07
13.50	13.50	16.00	13.50	Kiln Burnt, bbl..........bbl.	..... 13.50	13.50	13.50
15.00	13.50	18.50	13.50	Retort, bbls.............bbl.	13.50 15.00	15.00	13.50
1.75	1.15	1.15	1.15	Terra Alba Amer. No. 1, bgs or bbls mills.........100 lb.	1.15 1.75	1.75	1.15
2.00	1.50	1.50	1.50	No. 2 bags or bbls...100 lb.	1.50 2.00	2.00	1.50
.02½	.02	2.00	2.00	Imported bags........100 lb.	.02 .02½	.02½	.02
.....	.....	.....	.....	Tetrachlorethane, 50 gal dr...lb.	.09 .09½	.09½	.09
.20	.20	.20	.20	Tetralene, 50 gal drs wks.....lb.	..... .20	.20	.20
.24	.22	.22	.22	Thiocarbanilid, 170 lb bbl....lb.	.22 .24	.24	.22
.17½	.14½	.20½	.17½	Tin Bichloride, 50% soln, 100 lb bbls wks...............lb.	..... .14½	.14½	.14
.41½	.36½	.48	.41½	Crystals, 500 lb bbls wks...lb.	..... .35	.38	.34½
.58	.48	.71½	.58	Metal Straits NY.........lb.	..... .45	.48	.43¾
.75	53	.75	.70	Oxide, 300 lb bbls wks.....lb.	..... .50	.56	.49
.35½	.30½	.48	.35½	Tetrachloride, 100 lb drs wks. ....lb.	..... .29½	.30½	.28¾
.40	.40	.40	.40	Titanium Dioxide 300 lb bbl..lb	..... .24	.40	.24
.14	.13½	.13½	.13½	Pigment, bbls...........lb.	.08½ .09	.14	.08½
.45	40	.40	.40	Toluene, 110 gal drs........gal.	..... .45	.45	.45
.45	.35	.35	.35	8000 gal tank cars wks....gal.	..... .40	.40	.40
.94	.90	.90	.90	Toluidine, 350 lb bbls........lb.	.90 .94	.94	.90
.32	.31	.31	.31	Mixed, 900 lb drs wks.....lb.	.31 .32	.32	.31
.90	.85	.85	.85	Toner Lithol, red, bbls.......lb.	.90 .95	.95	.85
.80	.70	.75	.75	Para, red, bbls............lb.	..... .80	.80	.70
1.80	1.70	1.75	1.75	Toluidine..................lb.	1.50 1.55	1.55	1.50
3.90	3.60	3.60	3.60	Triacetin, 50 gal drs wks.....lb.	3.60 3.90	3.90	3.60
.....	.....	.....	.....	Trichlorethylene, 50 gal dr...lb.	.10 .10½		
.....	.....	.....	.....	Triethanolamine, 50 gal drs...lb.	.55 .60	.60	.55
.50	.36	.36	.36	Tricresyl Phosphate, drs.....lb.	.33 .45	.45	.33
.73	.69	.70	.69	Triphenyl guanidine.........lb.	.58 .60	.70	.58
.75	.70	.70	.70	Phosphate, drums.........lb.	.60 .70	.75	.60
3.00	2.50	2.50	2.50	Tripoli, 500 lb bbls......100 lb.	1.75 2.00	2.00	1.75
.66½	.50½	.86	.53½	Turpentine Spirits, bbls.....gal.	55½ .61½	.65	.51½
.59	.46	.76	.46	Wood Steam dist. bbls....gal.	..... .53	.57	.49
.20	.18	.18	.18	Urea, pure, 112 lb cases......lb.	.15 .17	.30	.15
				Fert. grade, bags c.i.f.....ton	..... 101.00	101.00	98.00
				c. i. f. S. points.........ton	..... 102.30	102.30	99.30
76.00	55.00	70.00	66.00	Valonia Beard, 42%, tannin bags..................ton	..... 45.00	55.00	45.00
55.00	58 00	49.50	39.00	Cups, 30-31% tannin.....ton	..... 32.00	35.00	31.00
64.00	45.00	68.00	43.00	Mixture, bark, bags.......ton	..... 35.00	43.00	35.00
2.10	1.75	1.95	1.55	Vermillion, English, kegs....lb..	2.00 2.05	2.05	2.00
.....	.....	.....	.....	Vinyl Chloride, 16 lb cyl.....lb.	..... 1.00	1.00	1.00
76.00	49.75	59.00	49.50	Wattle Bark, bags..........ton	46.50 47.25	49.75	43.50
.06½	.05¾	.05¾	.05¾	Extract 55%, double bags ex-dock....................lb.	..... .06½	.06½	.06½
1.25	1.25	1.25	1.25	Whiting, 200 lb bags, c-1 wks ....100 lb.	..... 1.25	1.25	1.25
13.00	13.00	13.00	13.00	Alba, bags c-1 NY........ton	..... 13.00	13.00	13.00
1.35	1.35	1.35	1.35	Gilders, bags c-1 NY...100 lb.	..... 1.35	1.35	1.35

Zinc

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
.05¾	5.85	.06½	.06½	Zinc Ammonium Chloride powd., 400 lb bbls.........100 lb.	5.25 5.75	5.75	5.25
.10	.09½	.09½	.09½	Carbonate Tech, bbls NY..lb.	.10½ .11	.11	.10½
.06	.06	.06	.06	Chloride Fused, 600 lb drs. wks.....................lb.	.05¾ .06	.06	.05¾
.06½	.06½	.06½	.06½	Gran., 500 lb bbls wks.....lb.	.06½ .06½	.06½	.06½
3.00	3.00	3.00	3.00	Soln 50%, tanks wks...100 lb.	..... 3.00	3.00	3.00
.41	.40	.40	.40	Cyanide, 100 lb drums.....lb.	.40 .41	.41	.40
				Dithiofuroate, 100 lb dr....lb.	..... 1.00	1.00	1.00
.09	.09	.09	.09	Dust, 500 lb bbls c-1 wks..lb.	.09½ 11	.08¾	.08½
6.40	6.07½	7.35	6.40	Metal, high grade slabs c-1 NY...............100 lb.	..... 6 45	6.45	6.45¾
.07⅞	.07⅞	.07⅞	.07⅞	Oxide, American bags wks..lb.	.07⅞ .07⅞	.07⅞	.07
.12⅞	.10⅞	.10⅞	.10⅞	French, 300 lb bbls wks...lb.	.09⅞ .11⅞	.11⅞	.09⅞
.....	.....	.....	.....	Perborate, 100 lb drs......lb.	..... 1.25	1.25	1.25
.....	.....	.....	.....	Peroxide, 100 lb drs.......lb.	..... 1.25	1.25	1.25
.....	.....	.....	.....	Stearate, 50 lb bbls........lb.	.25 .26	.26	.25
.03¾	.03½	.03½	.03	Sulfate, 400 bbl wks.......lb.	.03¼ .03½	.03¾	.03½
.32	.30	.30	.30	Sulfide, 500 lb bbls........lb.	.30 .32	.32	.30
.30	.29	.29	.29	Sulfocarbolate, 100 lb keg..lb.	.29 .30	.30	.29
.32	.32	.38	.32	Xylene, 10 deg tanks wks...gal.	..... .33	.33	.33
.32	.30	.36	.30	Commercial, tanks wks...gal.	.30 .32	.32	.30
.38	.38	.35	.35	Xylidine, crude.............lb.	..... .38	.38	.38
.03	.02½	.02½	.02½	Zirconium Oxide, Nat. kegs...lb.	.02½ .03	.03	.02½
.50	.45	.45	.45	Pure kegs..................lb.	.45 .50	.50	.45
.10	.08	.08½	.08	Semi-refined kegs..........lb.	.08 .10	.10	.08

Oils and Fats

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
.14½	.13	.14	.13	Castor, No. 1, 400 lb bbls.....lb.	.13 .13½	.13½	.13
.14	.12½	.14	.12½	No. 3, 400 lb bbls.........lb.	.12½ .13	.13	.12½
.17	.14	.18	.17	Blown, 400 lb bbls.........lb.	.14 .15	.15	.14
.17	.14½	.31	.13½	China Wood, bbls spot NY...lb.	..... .15½	.15½	.14½
.14¾	.14¾	.18	.12½	Tanks, spot NY.........lb.	.... .15	.15	.13½
.14¾	.12¾	.....	.....	Coast, tanks, Oct........lb.	..... .14½	.14½	.12½
.11½	.10¾	.12	.12	Cocoanut, edible, bbls NY....lb.	..... .10¾	.10¾	.10¾
.10	.09½	.09⅝	.09	Ceylon, 375 lb bbls NY....lb.	..... .08½	.09½	.07⅞
.09	.08⅛	.08⅛	.08	8000 gal tanks NY......lb.	.06⅞ .07	.08⅛	.06⅞
.10½	.09½	.10½	.09½	Cochin, 375 lb bbls NY....lb.	.08¾ .09½	.10	.09½
.09¾	.08⅞	.10	.08½	Tanks NY...............lb.	..... .08½	.09½	.08½
.10	.08⅛	.09⅝	.08½	Manila, bbls NY...........lb.	..... .08	.09½	.07⅞
.08⅞	.08	.08⅝	.08½	Tanks NY...............lb.	..... .07	.08⅛	.06⅞
.08½	.07⅞	.08¾	.08	Tanks, Pacific Coast.....lb.	.6¾ .06¾	.08	.06⅞

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1829 $1.047 - Sept 1929 $1.041

September 1 were below those of last year. A considerable amount of old crop India seed was believed to have been carried over into the new India season beginning April 1, but exports from April 1 to August 24, were about 1,500,000 bushels above those of the same period last year and stocks have probably been reduced. The present exportable surplus in Argentina is not definitely known. An official estimate of the surplus on August 15 was 26,417,000 bushels or 4,000,000 bushels above the surplus at the same period last year. This estimate is considered very high by trade sources which place the surplus at some 20,000,000 bushels. This figure would seem to be borne out by statistics available on production and exports during the present season. Argentina also estimates a 45 per cent shortage in flaxseed. Records were also established in production and consumption of linseed oil during the second quarter. The total quantity of oil manufactured was 184,087,611 pounds, with consumption reaching a few thousand over 249,000,000 pounds. Of this total, a small amount was exported, 138,210,000 pounds used in factories, while consumption in other channels was 110,310,000 pounds. The exceedingly high consumption caused a large reduction in stocks and supplies at factories and warehouses, the total of which on July 1, 1929, approximated 123,000,000 pounds, a decline of about 68,000,000 pounds under figures on hand for same date of the previous year. This figure represents the smallest July 1 oil stocks since 1924 when total was approximately 74,000,000 pounds. Import and export statistics covering United States trade in linseed oil for the first half of 1929, together with comparative figures for the corresponding period of last year, were as follows: 1928, Imports 127,161 pounds, $9,911; 1929, 6,630,777 pounds, $413,841; 1928, Exports 981,401 pounds, $113,154; 1929, 1,036,089 pounds, $115,440.

Perilla Oil — Encouraged by conditions in the linseed oil market, prices on perilla have advanced almost 2c lb. during the past month, so that crude oil in tanks at the Coast is now at 15⅜c lb.

Soy Bean Oil — Has joined the rather general advance in the oil market and is now at 9¾c lb. in tanks at the mills. Has been in big demand due to high prices on linseed oil and in addition has become rather scarce with the new crop not due until somewhat later in the Fall.

Tallow — Extra has advanced 1c lb. during the past month due to concerted demand which has characterized the market. Is now at 8½c lb.

1928 High	1928 Low	1927 High	1927 Low		Current Market		1929 High	1929 Low
				Cod, Newfoundland, 50 gal bbls				
.69	.63	.66	.63	........gal.	.....	.60	.64	.60
.63	.60	.59	.59	Tanks NY..........lb.	.....	.60	.60	.60
				Cod Liver see Chemicals........				
.06½	.05½	.06	.06	Copra, bags..........lb.	.....	.045	.05½	.042
.11	.10	.11	.07	Corn, crude, bbls NY........lb.	.....	.10½	.10½	.09½
.10	.08¾	.09¾	.07	Tanks, mills..........lb.	.....	.08½	.09¾	.07¾
.12½	.11¼	.14	.10½	Refined, 375 lb bbls NY....lb.	.....	.11¼	.11¾	.10½
.11½	.10¾	.12	.11	Tanks..........lb.	.....	.10	.11	.09
.09½	.07¾	.09½	.06½	Cottonseed, crude, mill......lb.	.....	Nom.	.09	.08½
10.65	.09½	.11½	.08 1/5	PSY 100 lb bbls spot......lb.	.....	.092	.1075	.092
10.75	.09½	.....	.....	Oct.—Dec.......... lb.	.....	.093	.1080	.093
				Degras, American, 50 gal bbls				
.05	.04½	.04½	.04½	NY..........lb.	.04½	.05	.05	.04½
.05¾	.04½	.04¾	do	English, brown, bbls NY....lb.	.....	.05¾	.05¾	.05¾
.05¾	.05½	.05½	.05½	Light, bbls NY ....lb.	.....	.05¾	.05¾	.05¾
				Greases				
.08½	.07	.07½	.06	Greases, Brown..........lb.	.....	.06½	.08½	.06
.08½	.07	.08	.06½	Yellow..........lb.	.....	.07½	.08½	.06½
.11	.09½	.10½	.08¾	White, choice bbls NY.....lb.	.....	.08¾	.11½	.07½
.42½	.40	.....	.....	Herring, Coast, Tanks......gal.	.....	Nom.		
Nom.	.09½	.09½	.09	Horse, bbls..........lb.	.09½	Nom.	Nom.	.....
.16½	.15½	.16¾	.14¾	Lard Oil, edible, prime.......lb.	.....	.15¼	.15¾	.14¾
.13½	.12	.13¾	.10¾	Extra, bbls..........lb.	.....	.12½	.13½	.12
.13	.11	.12½	.10½	Extra No. 1, bbls..........lb.	.....	.12	.13½	.11¾
10.8	10.0	.11 4/5	.10 2/5	Linseed, Raw, five bbl lots...lb.	.....	.162	.162	.105
10.4	9.6	.11 9/10	.09 6/10	Bbls c-1 spot..........lb.	.....	.158	.158	.101
9.6	8.8	.10½	.09	Tanks..........lb.	.....	.15	.15	.093
.09¾	.09¾	.09¾	.09¾	Lumbang, Coast..........lb.	.....	.09¾	.09¾	.09¾
.48	.40	.47½	.44	Menhaden Tanks, Baltimore.gal.	.....	.46	.52	.45
.09	.09	.90	.10	Blown, bbls NY..........lb.	.....	.09	.09	.09
.70	.67	.70	.67	Extra, bleached, bbls NY..gal.	.....	.70	.70	.70
.64	.63	.66	.63	Ligh, pressed, bbls NY....gal.	.63	.64	.64	.63
.67·	.66	.66	.69	Yellow, pressed, bbls NY..gal.	.66	67	.67	.66
				Mineral Oil, white, 50 gal bbls				
.60	.40	.....	.....	..........gal.	.40	.60	.60	.40
1.00	.95	.....	.....	Russian, gal..........gal.	.95	1.00	1.00	.95
.19	.18½	.18¾	.14½	Neatsfoot, CT, 20° bbls NY lb.	.....	.18½	.19	.18½
.13½	.12	.13¼	.10¼	Extra, bbls NY..........lb	.. ..	.12¼	.13½	.12
.16½	.15½	.16¾	.12½	Pure, bbls NY..........lb.	.....	.14½	.15½	.13½
.17¾	.11¾	.18½	.10	Oleo, No. 1, bbls NY........lb.	.....	.11½	.11½	.10¾
.15½	.11	.17	.08¾	No. 2, bbls NY...... ..lb	.....	.10½	.11½	.10
.14	.10	.14	.08½	No. 3, bbls NY..........lb.	.. ..	.10½	.10½	.09¾
1.40	1.18	1.75	1.40	Olive, denatured, bbls NY...gal.	1.05	1.15	1.40	1.05
2.00	1.75	2.00	2.45	Edible, bbls NY..........gal.	1.95	2 00	2.00	1.95
.11	.09¾	.10½	.08¾	Foots, bbls NY..........lb.	.09	.09½	.11½	.09
.09½	.08½	.09½	.09	Palm, Kernel, Casks..........lb.	.....	.08½	.09	.08
.09¾	.07¾	.08¾	.07½	Lagos, 1500 lb casks.......lb.	.....	.07½	.09	.07⅝
.08¾	.07	.08½	.07½	Niger, Casks..........lb.	.....	.07½	.08¾	.07½
.12½	.12	.14½	.12	Peanut, crude, bbls NY......lb.	.....	Nom	Nom.	.....
.17	.14½	.15½	.14½	Refined, bbls NY..........lb.	. 4½	15	.15	.14½
.21	.13	.16½	.12½	Perilla, bbls NY..........lb.	.....	.16½	.20	.15
.15½	.10½	.14½	.10	Tanks, Coast..........lb.	.....	.15⅜	15⅜	.13½
1.75	1.70	1.70	1.70	Poppyseed, bbls NY........gal.	1.70	1.75	1.75	1.70
1.06	1.01	1.05	1.00	Rapeseed, blown, bbls NY...gal.	1.04	1.04	1.04	1.04
.92	.83	.90	.82	English, drms. NY........gal.	.....	.83	.90	.82
.90	.81	.85	.76	Japanese, drms. NY......gal.	.....	.77	.88	.77
.10¾	.09½	.10	.09	Red, Distilled, bbls..........lb.	.10¾	.11	.11½	.10¾
.09½	.08	.09½	.08½	Tanks..........lb.	.....	.09½	10½	.09½
.5[illegible]	.42	.50	.50	Salmon, Coast, 8000 gal tks..gal.	.42	.44	.44	.42
.50	.41	.47	.43	Sardine, Pacific Coast tks...gal.	.....	.47	.51	.45
.13½	.12	.13	.11½	Sesame, edible, yellow, dos...lb.	.11½	.12	.12	.11½
.15	.12½	.14	.14	White, dos..........lb.	.12½	.12½	.12½	.12½
.40	.40¾	.40	.40	Sod, bbls NY..........gal..	.....	.40	.40	40
.....	.....	.09¾	.09½	Soy Bean, crude..........				
.09¾	.09	.....	.....	Pacific Coast, tanks.......lb.	.....	.10⅜	.10⅜	.09
				Domestic tanks, f.o.b. mills, ...lb.	.....	.09¾	.09¾	.08½
.12½	.12	.12½	.10¾	Crude, bbls NY.........lb.	.....	.12¾	.12¾	.11[illegible]
.10¾	.10½	.11	.10½	Tanks NY..........lb.	.....	.11½	.11½	.10½
.13¾	.13½	.13	.12	Refined, bbls NY..........lb.	.13½	.13½	.13½	.13½
				Sperm, 38° CT, bleached, bbls				
.85	.84	.85	.84	NY..........gal.	.84	.85	.85	.84
.80	.79	.82	.79	45° CT, bleached, bbls NY gal.	.79	.80	.80	.79
				Stearic Acid, double pressed dist				
.18½	.11	.13½	.11½	bags..........lb.	.15½	.16	.18½	.15½
				Double pressed saponified bags				
.19	.11½	.14	.11½	..........lb.	.16	.16½	.19	.15¾
.20½	.13½	.15½	.13½	Triple, pressed dist bags..lb	.18	.18½	20½	.17¾
.12½	.09½	.13	.08¾	Stearine, Oleo, bbls..........lb.	.11	.11½	.12	.09¾
.09½	.08½	.09	.07½	Tallow City, extra loose......lb.	.....	.08½	.08¾	.07
.10¾	.09¾	.11	.08½	Edible, tierces..........lb.	.....	.09½	.10½	.08
.12½	.11½	.10¾	.08½	Tallow Oil, Bbls, c-1 NY...lb.	.....	.11	.12	.10¾
.11½	.10½	.12½	.10	Acidless, tanks NY........lb.	.....	.10	.11	.09¾
Nom.	.08	.08½	.07½	Vegetable, Coast mats.....lb.	.08	Nom.	Nom.	.08
.11	.....	.11	.11	Turkey Red, single bbls......lb.	.11	.12	.12	.11
.16	.14	.14	.14	Double, bbls..........lb.	.14	.16	.16	.14
				Whale, bleached winter, bbls				
.80	.78	.78	.78	NY..........gal.	.78	.80	.80	.78
.82	.80	.80	.80	Extra, bleached, bbls NY..gal.	.80	.82	.82	.80
.78	.76	.76	.76	Nat. winter, bbls NY.....gal.	.76	.78	.78	.76

Index To Advertisers

"WE"—Editorially Speaking

Glenn E. Matthews, who shows just what a big part chemicals play in Hollywood's major industry, is a graduate of the University of Minnesota. He took his master's degree in science in 1921, and since that time has been photographic chemist and technical editor, Kodak Research Laboratories. He is a member of the American Chemical Society, Alpha Chi Sigma, and the Kodak Camera Club. He is the author of numerous papers on corrosion, effect of moisture and oil on photographic film, chemistry of motion pictures, and mixing photographic chemicals. He has also lectured on the subject of making motion pictures and of mixing photographic chemicals. He is the contributor of the articles on photographic progress in the 1928 Year Book and the 1929 Supplement of the New International Encyclopedia.

Rolland H. French, president of Chemical Solvents, Inc., needs no introduction to readers of CHEMICAL MARKETS. We claim him as a valued contributor since he has appeared in these pages several times before. In the present issue, he writes on solvents, out of the very considerable experience he has had in many years of intimate contact with that subject.

Edward R. Weidlein, director, Mellon Institute of Industrial Research, has spent his entire career in scientific research. He first became connected with the Institute in 1912 as senior fellow, in charge of investigations on the metallurgy and hydrometallurgy of copper. In 1916 he entered the institute as assistant director, was appointed associate director in 1916 and director in 1921. As chemical expert for the War Industries Board, to which position he was appointed in 1918, his activities received the highest official commendation. He belongs to numerous scientific, political and economic societies, honorary and social fraternities. He has written extensively on activities of the Mellon Institute and the value and administration of scientific research in behalf of industry. The most recent of these latter articles is found in these pages.

Willard L. Thorp is well-known as a practical economist. He is professor of economics at Amherst College, and Member of the Research Staff, National Bureau of Economic Research, Inc. As a member of this latter special committee, of the President's Conference on Unemployment, he engaged in special investigation in connection with the report on "Recent Economic Changes", which report, prepared by him, received wide circulation throughout the country.

COMING FEATURES

THE CHEMICAL LADY

"Sex Appeal" at last finds its way into chemical business. Dr. Gustavus J. Esselen, Jr., presents a most unusual contribution on the part played by chemicals in clothing milady.

ALKALI DEVELOPMENTS

E. E. Routh, sales manager, Mathieson Alkali Works, traces the history of alkali manufacture in this country and in the light of past developments, points to the probable future.

CHEMICALS IN THE REFRIGERATION INDUSTRY

Dr. J. B. Churchill, refrigerant authority, writes of the contributions of chemicals to this industry.

MARKET ANALYSIS

Dr. T. K. Urdahl, prominent economist, and former examiner, Federal Trade Commission, outlines the importance of such analysis in chemical marketing.

When the Canadian Bureau of Statistics was organized following legislation passed in 1918, one of the first subjects given attention was Canada's growing chemical industry. In 1919 the chemical division was established with S. J. Cook its present chief, in charge. Later, the scope of the work was widened and the name changed to the "Mining, Metallurgical and Chemical Branch."

A specialist in chemistry and mineralogy, trained in the University of Toronto and with a background of teaching experience and several years practical laboratory work as a certified Dominion Analyst doing food and drug analyses, Mr. Cook brought to the new task a broad general knowledge of Canada's chemical industry and his reports are comprehensive and authoritative. He is well known as a contributor to technical journals and as the author of numerous pamphlets on chemical and mining subjects. He is actively interested in all matters pertaining to the profession of chemistry. The Canadian Institute of Chemistry claims him as a Charter Fellow and a member of its first Council. He is also a member of the American Chemical Society and an Associate of the Institute of Chemistry of Great Britain and Ireland and has held office in the Society of Chemical Industry and the Canadian Institute of Mining and Metallurgy. He was one of the founders and the first honorary secretary of the Professional Institute of the Civil Service of Canada, an organization of those engaged in scientific and technical work in the Federal government service.

Everett W. Boughton, who discusses the new white pigment developments as represented by the titanium dioxide group, has been successively associate chemist, U. S. Bureau of Standards; chief chemist, Congoleum Co., chemist with E. I. du Pont de Nemours & Co., Inc., and manager of technical service, New Jersey Zinc Co. He is at present manager of the paint department, R. T. Vanderbilt Co., Inc., which company markets the titanium dioxide pigments.